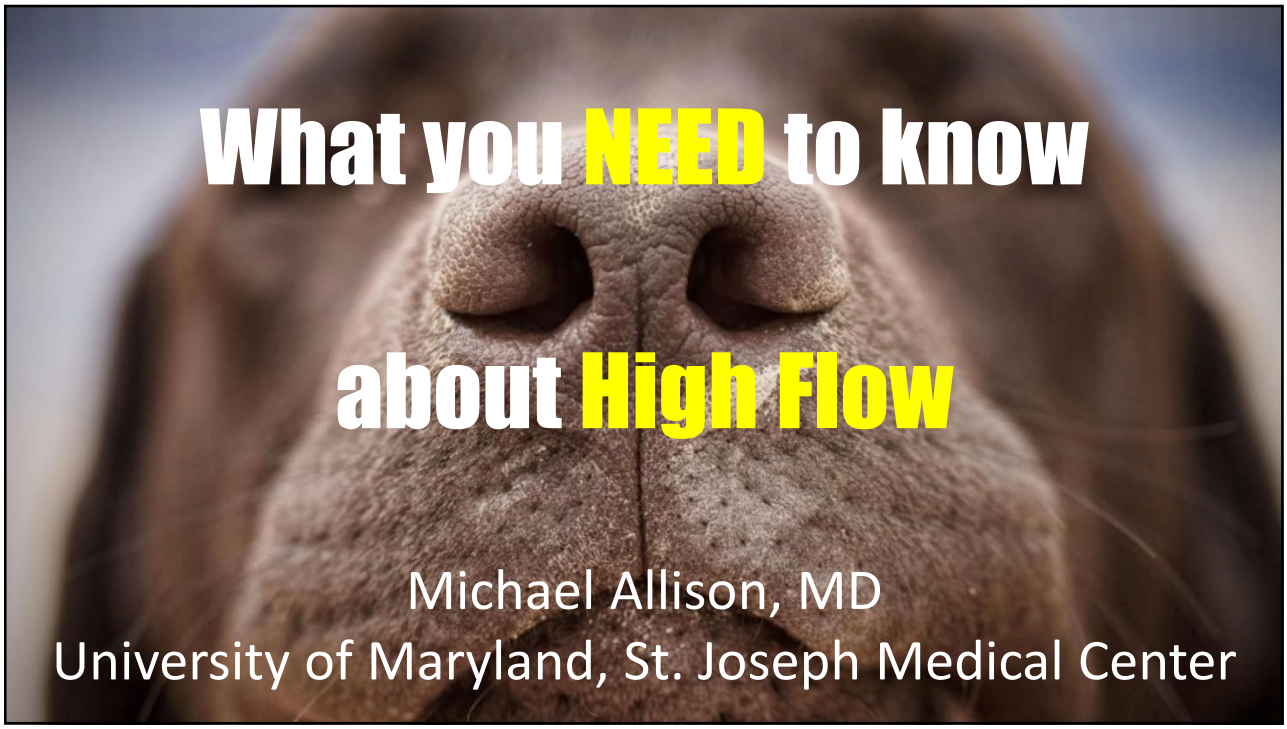

What you NEED to know
about High Flow
Michael Allison, MD
University of Maryland, St. Joseph Medical Center

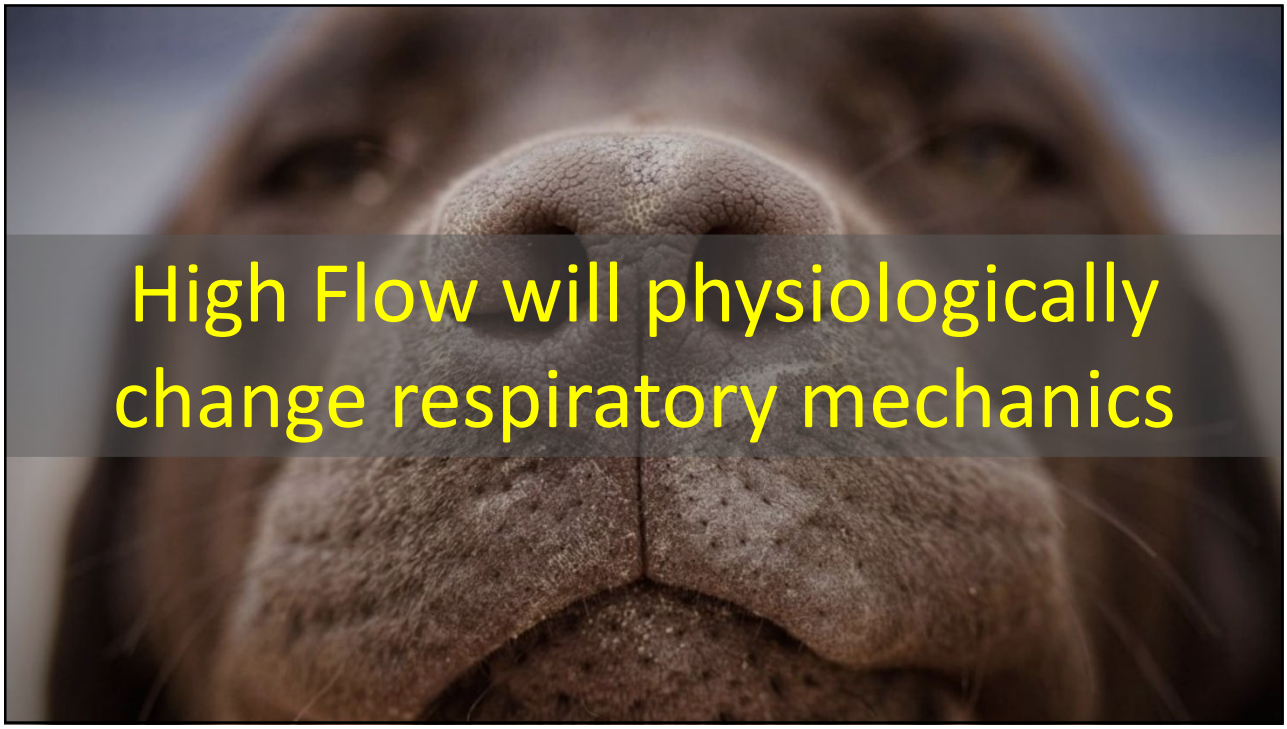
1


Disclosures

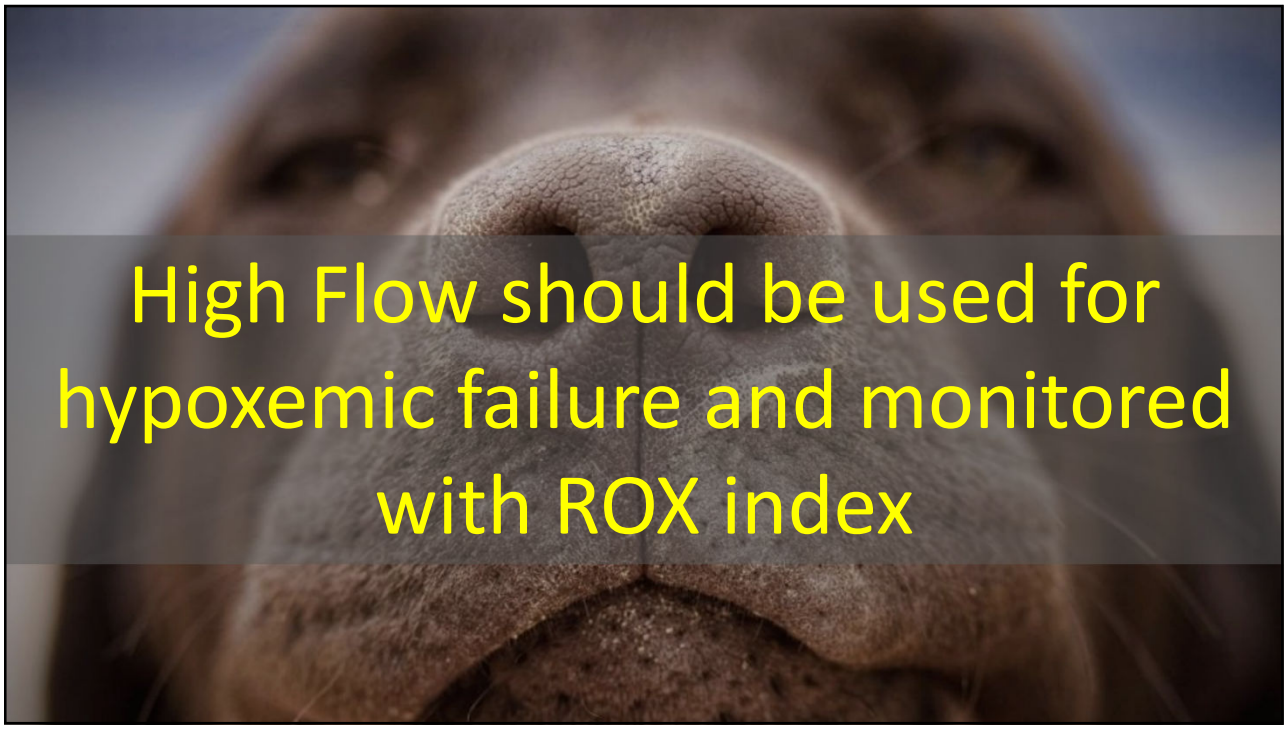
2


Really...

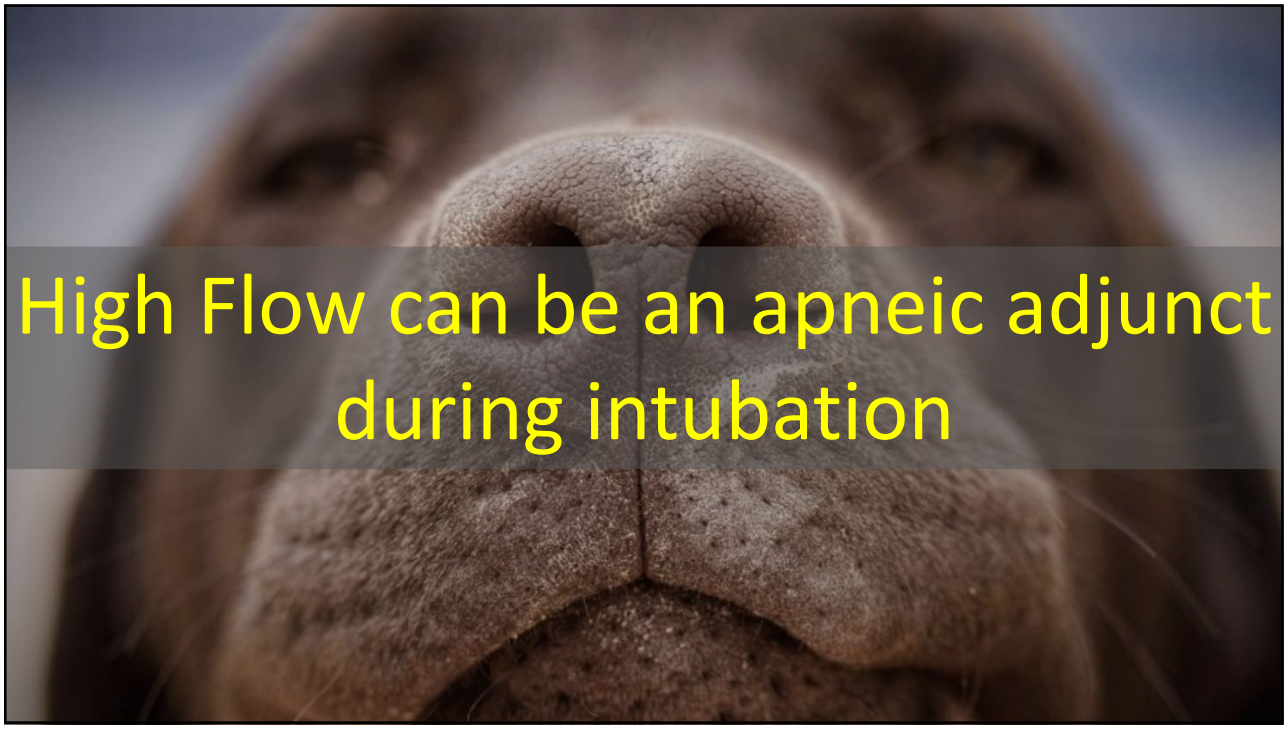
3


High Flow will physiologically change respiratory mechanics

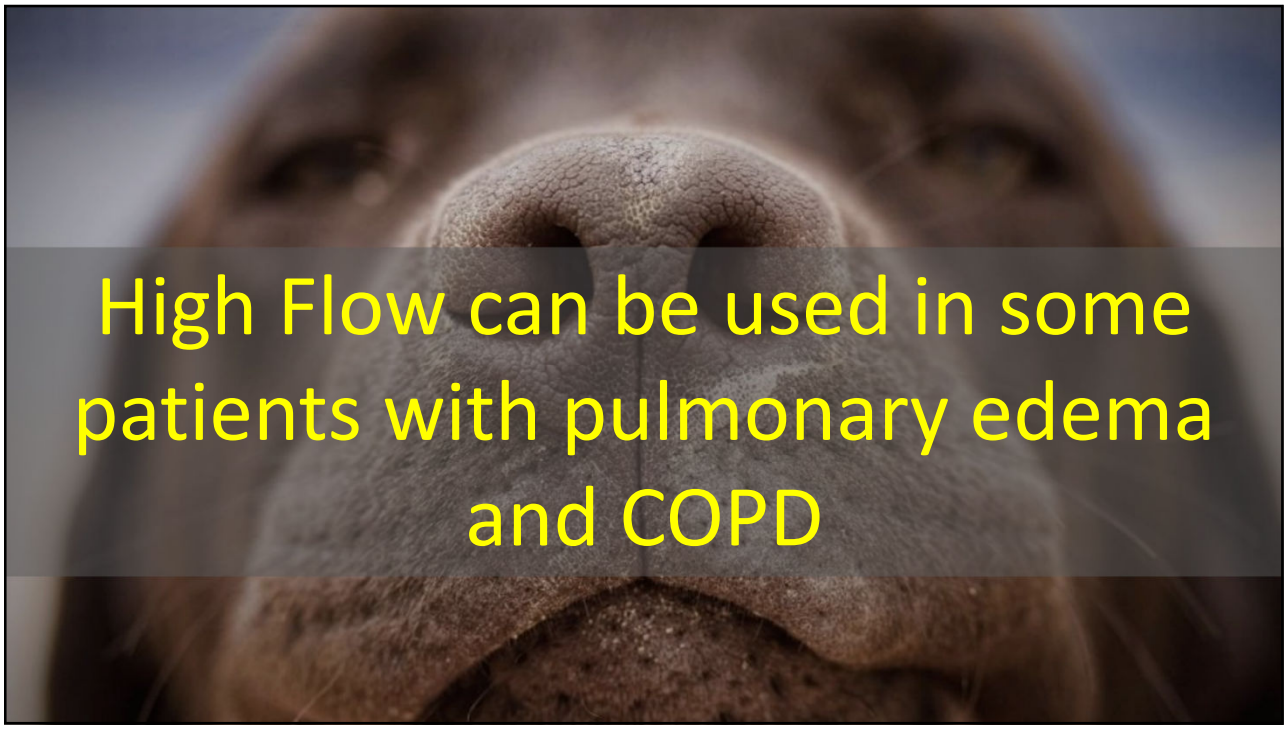
4


High Flow should be used for hypoxemic failure and monitored with ROX index

5


High Flow can be an apneic adjunct during intubation

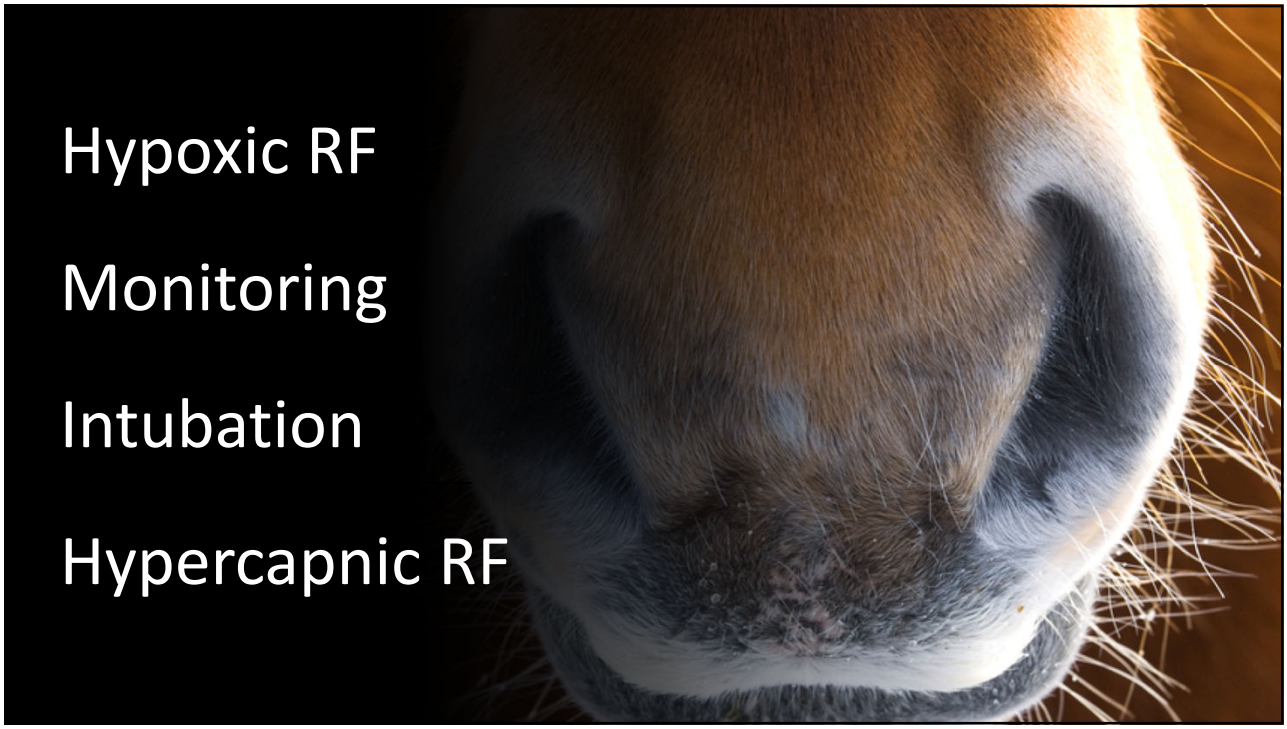
6


High Flow can be used in some patients with pulmonary edema and COPD

7


O_2 Entrainment
PEEP
Washout

8

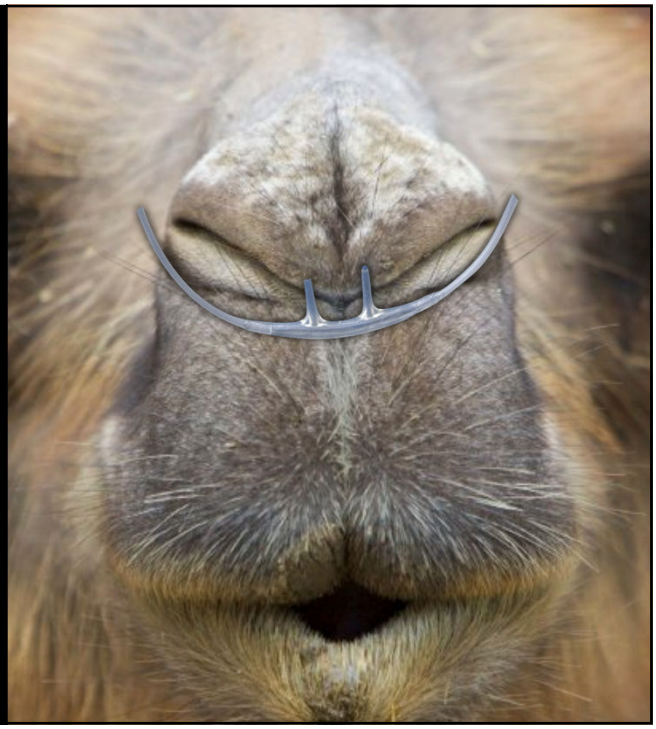

Hypoxic RF
Monitoring
Intubation
Hypercapnic RF

9


Mechanisms
and Physiology

10

OXYGEN DILUTION



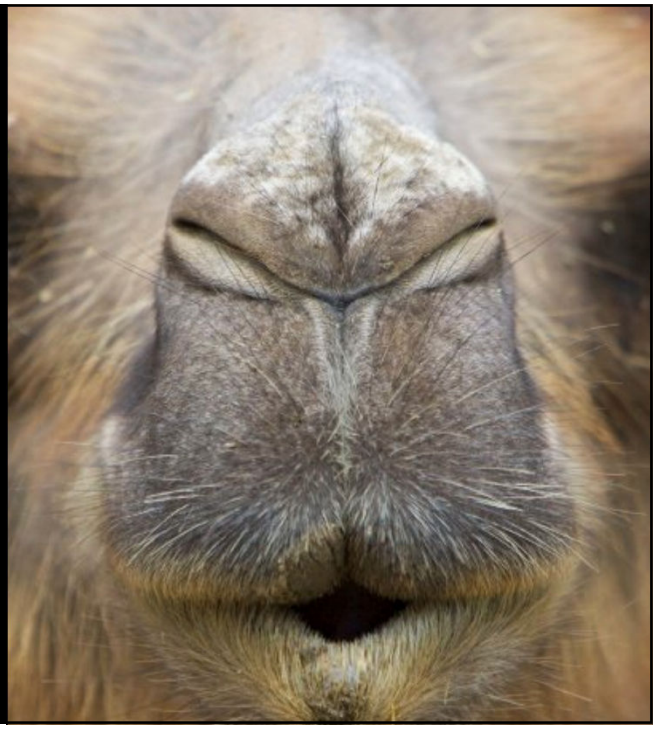
11

RESTING BREATHING

15-30 LPM

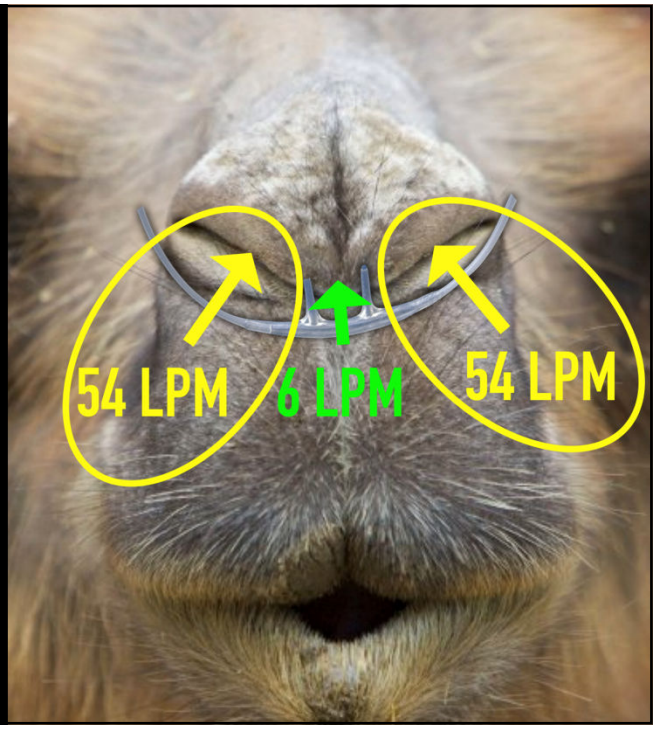
RESPIRATORY DISTRESS

>60 LPM



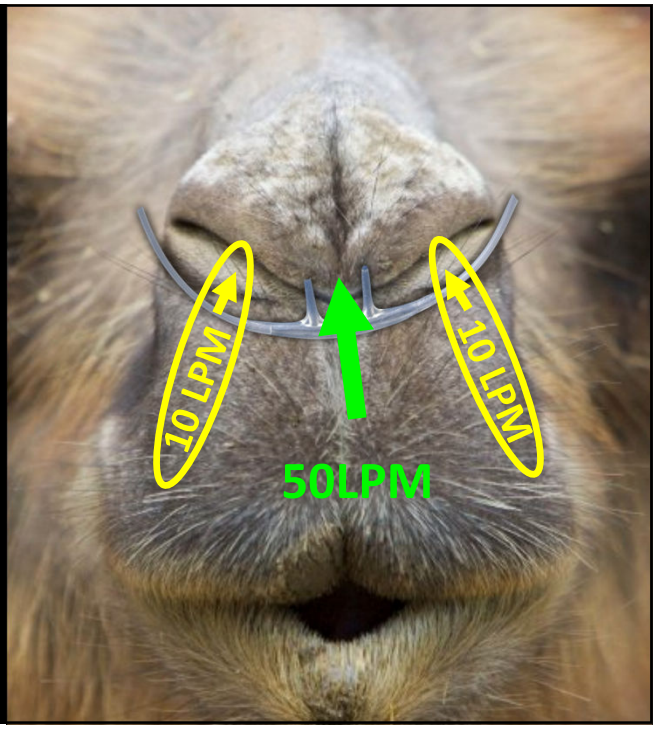
12

LOW
FLOW



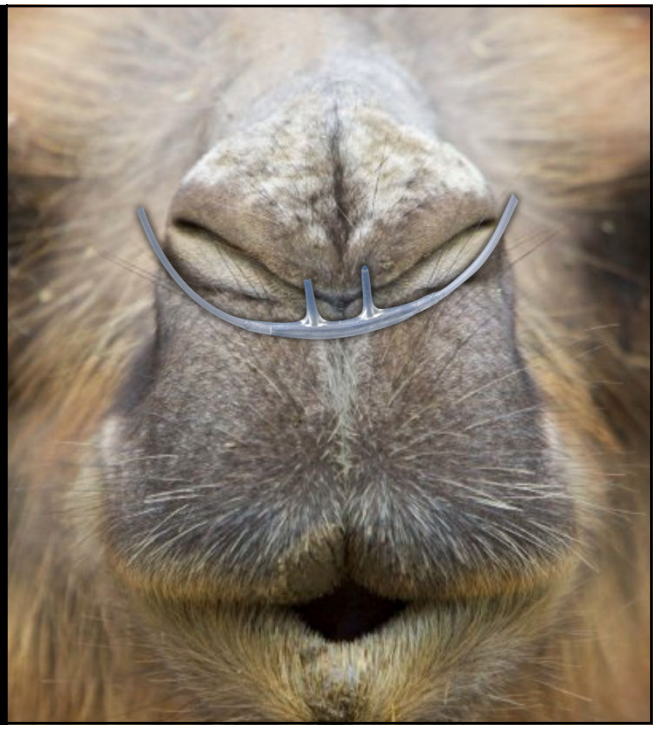
13

HIGH
FLOW



14

There is more consistent and reliable delivery of the prescribed FiO2



15

POSITIVE PRESSURE

16

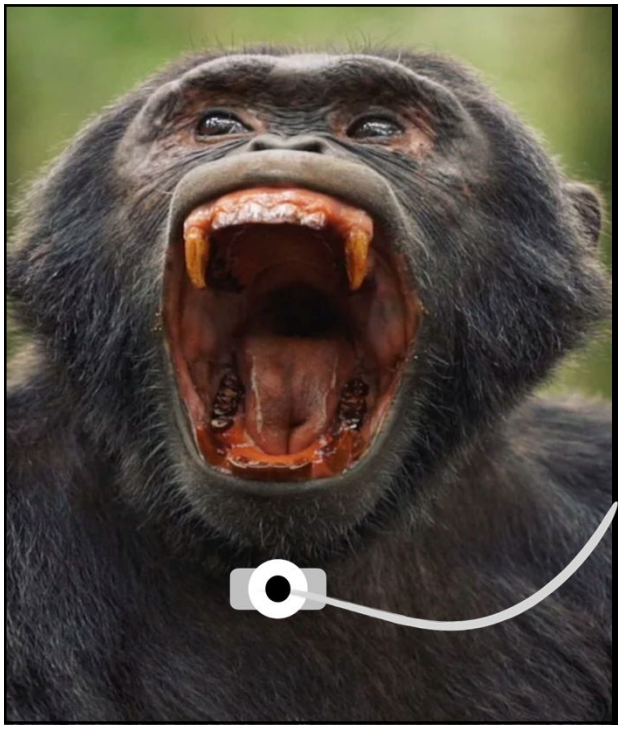
MOUTH CLOSED

4-6 CM H_2O

MOUTH OPEN

0-1 CM H_2O

17



TRACHEA

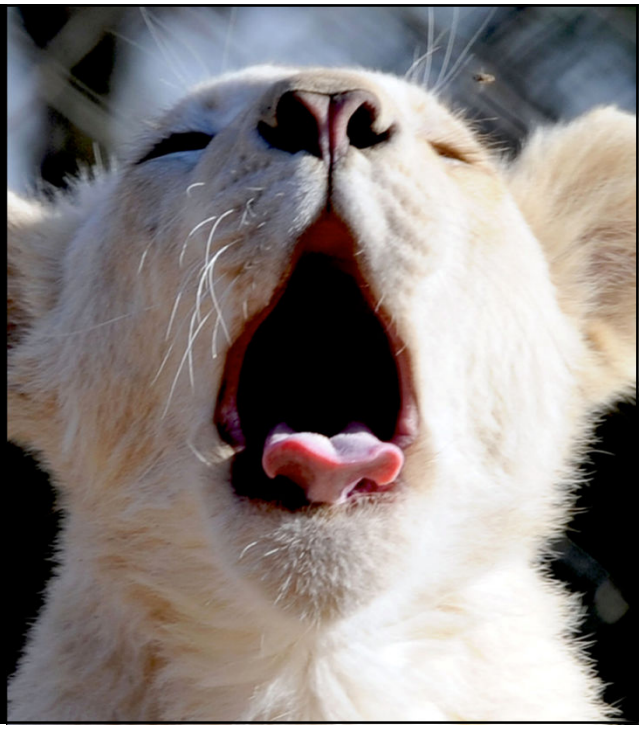
2 CM H_2O

18

There is slight, flow-dependent, positive pressure effect

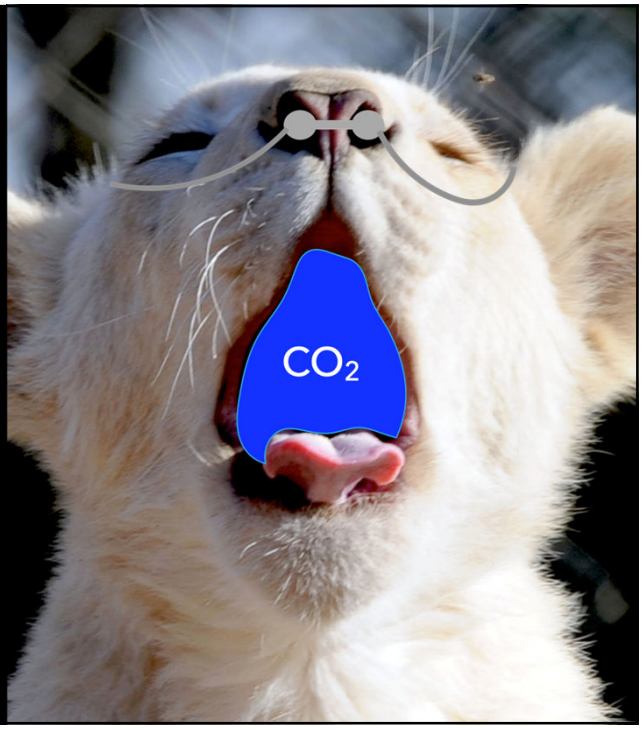
19

WASH OUT



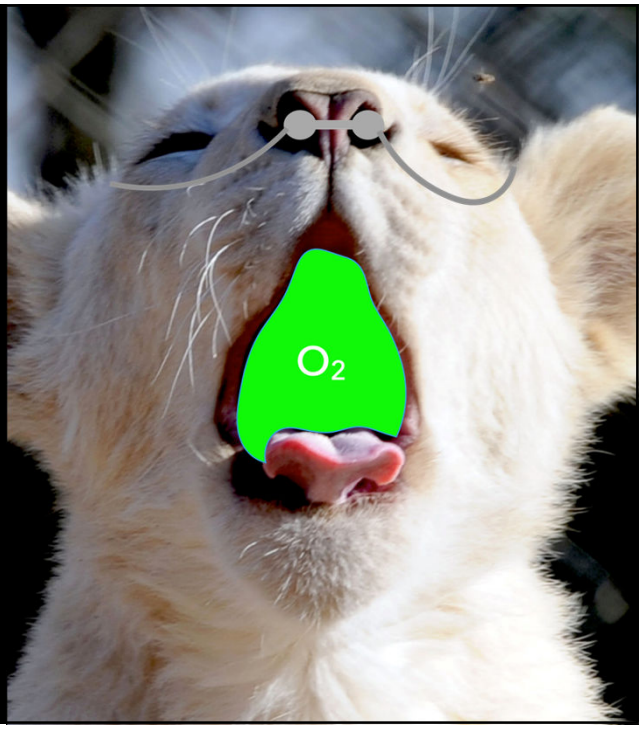
20

CO_2 Containing Dead Space



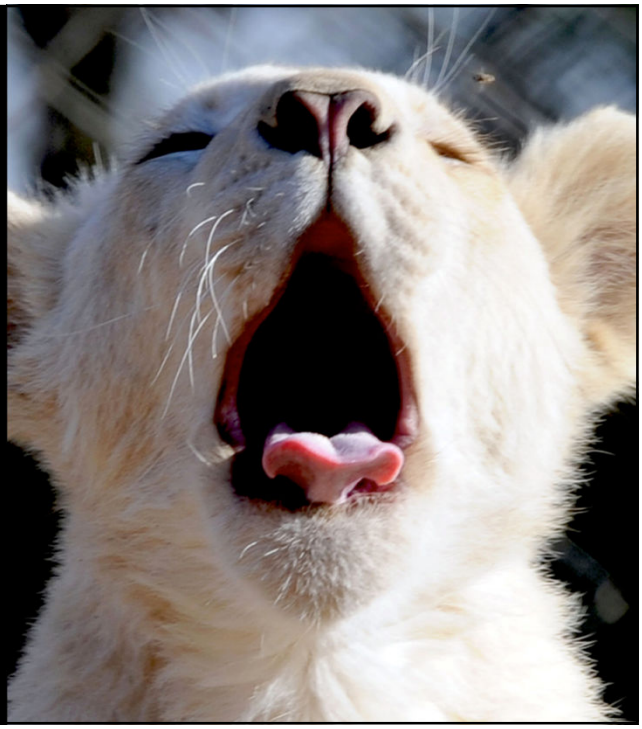
21

O_2 Containing Space

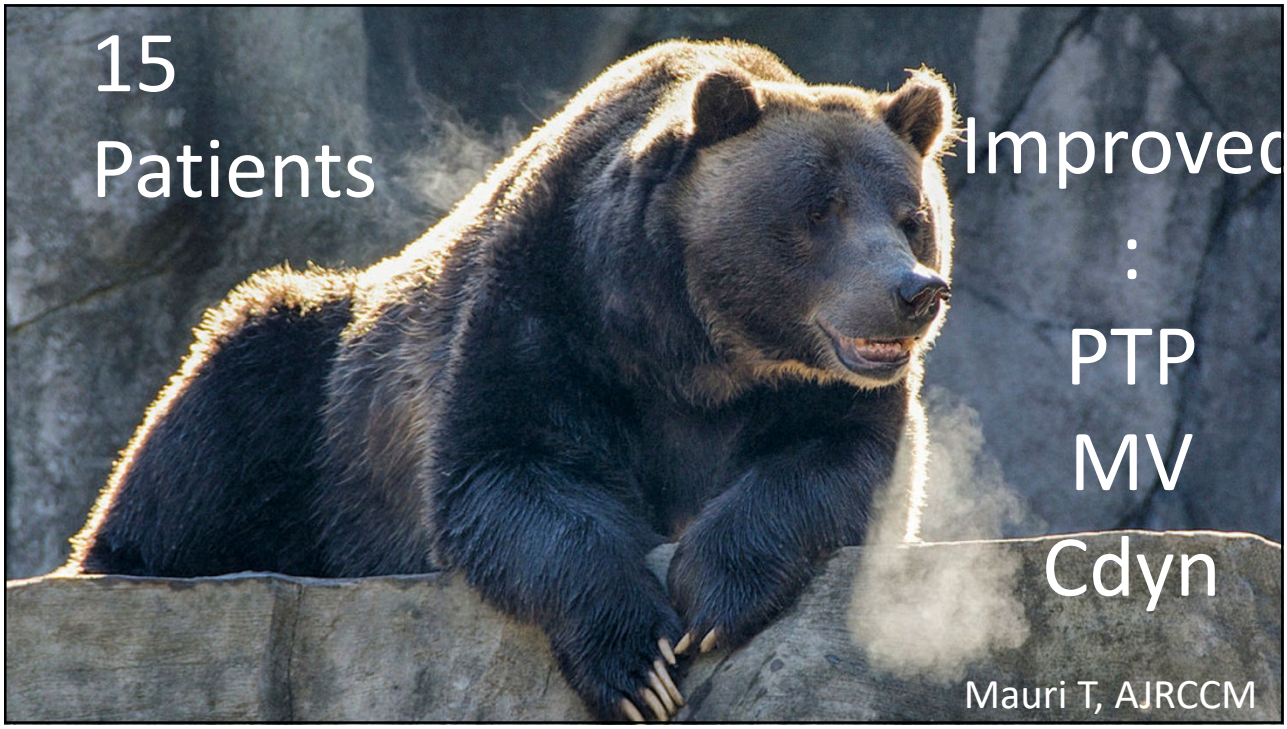


22

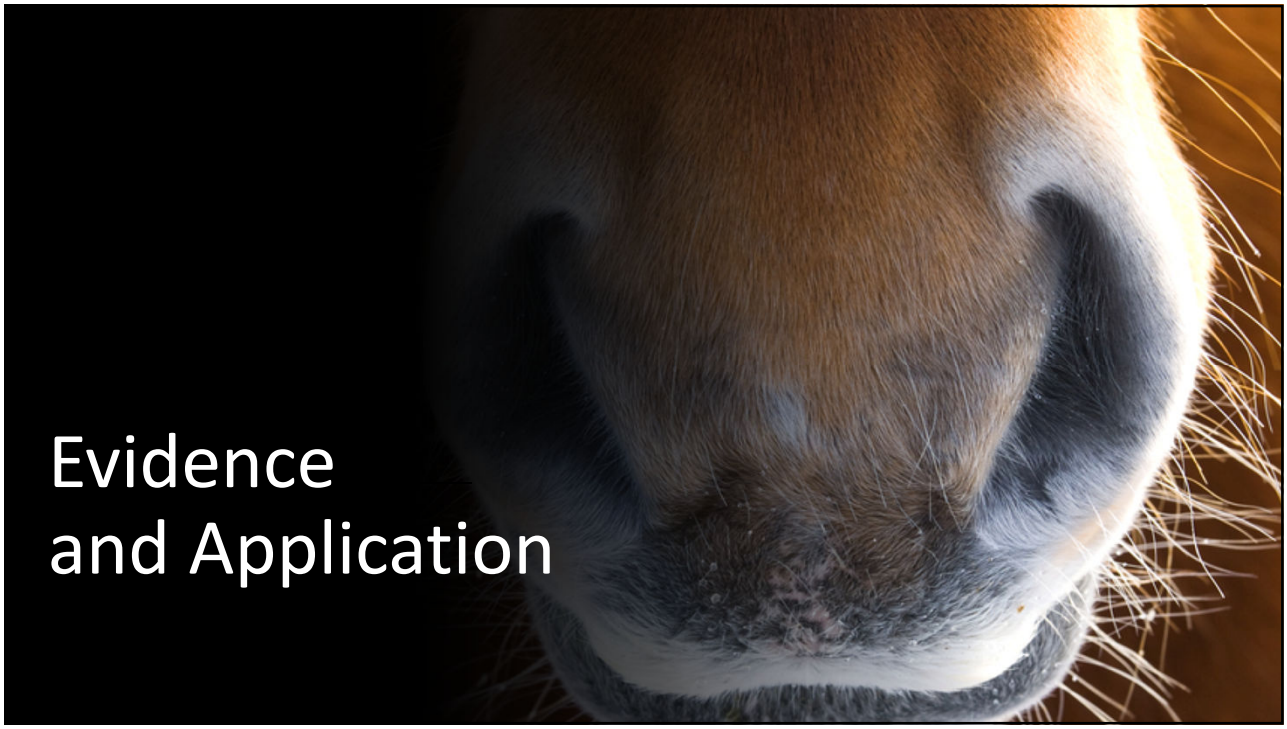
There is a flow-dependent washout effect of the oropharynx



23

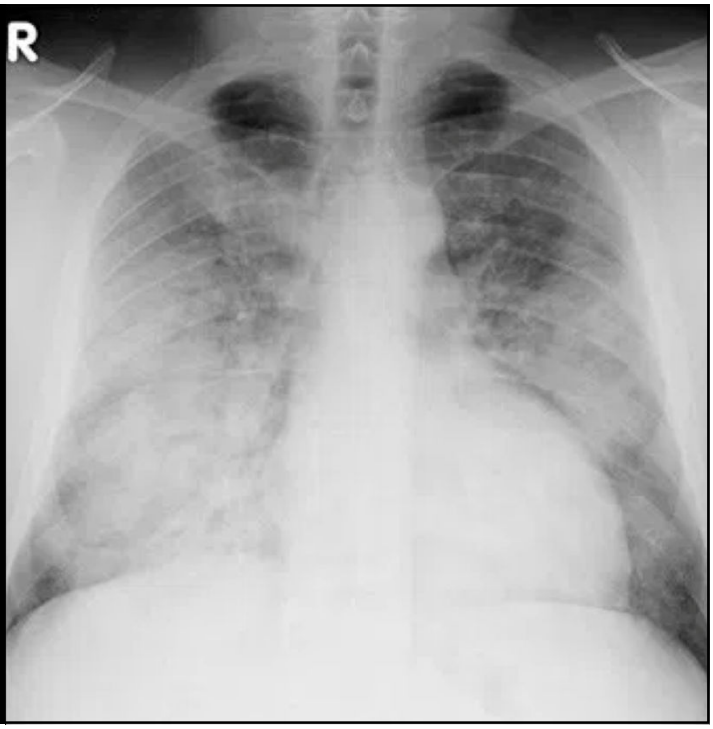


24



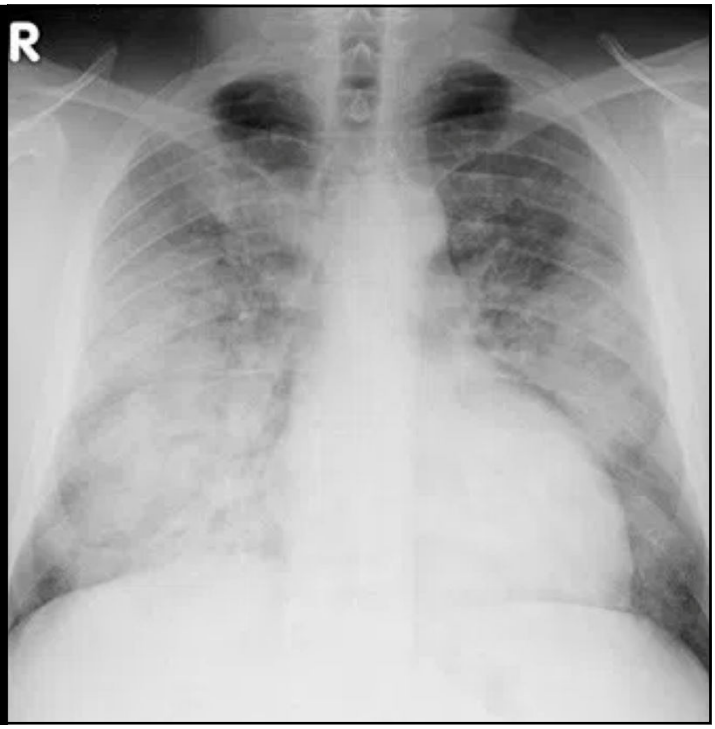
25

NEXT SHIFT
54-year-old
SARS CoV-2
6 LPM NC



26

What Next?



27

FLORALI

RCT

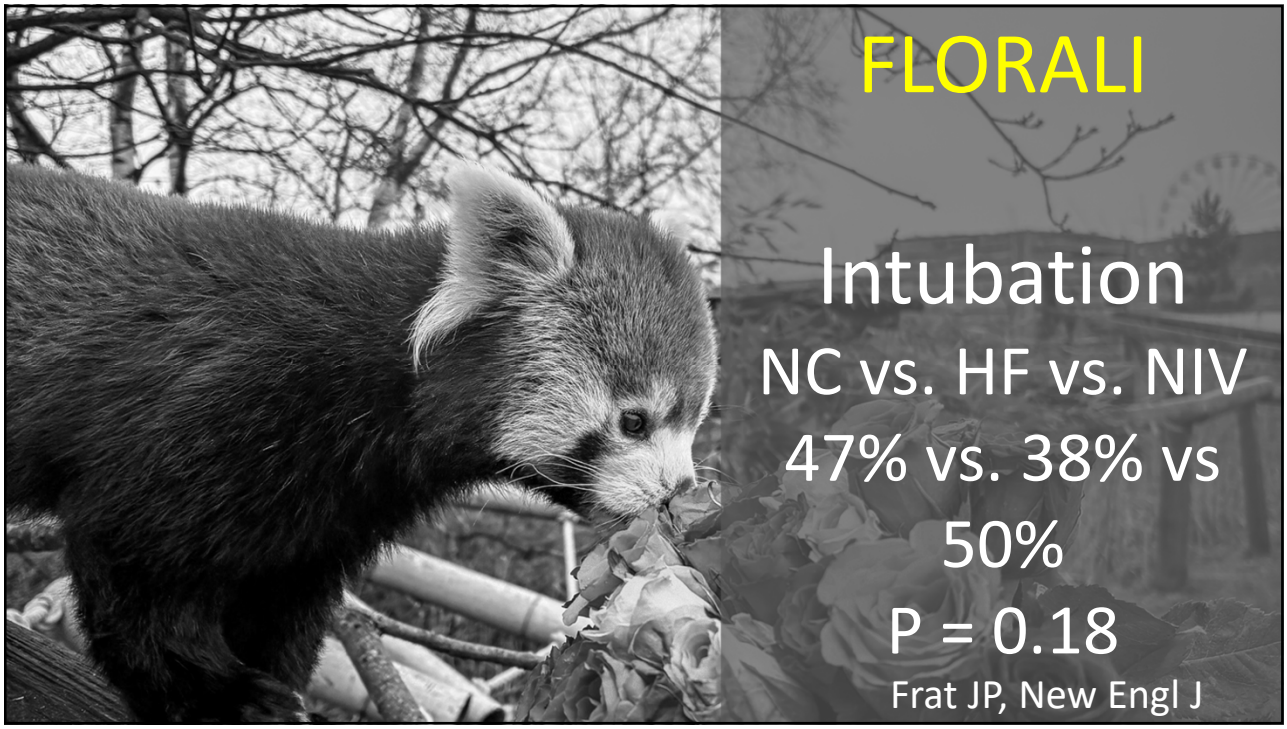
NC vs. HF vs. NIV

1° - Intubation

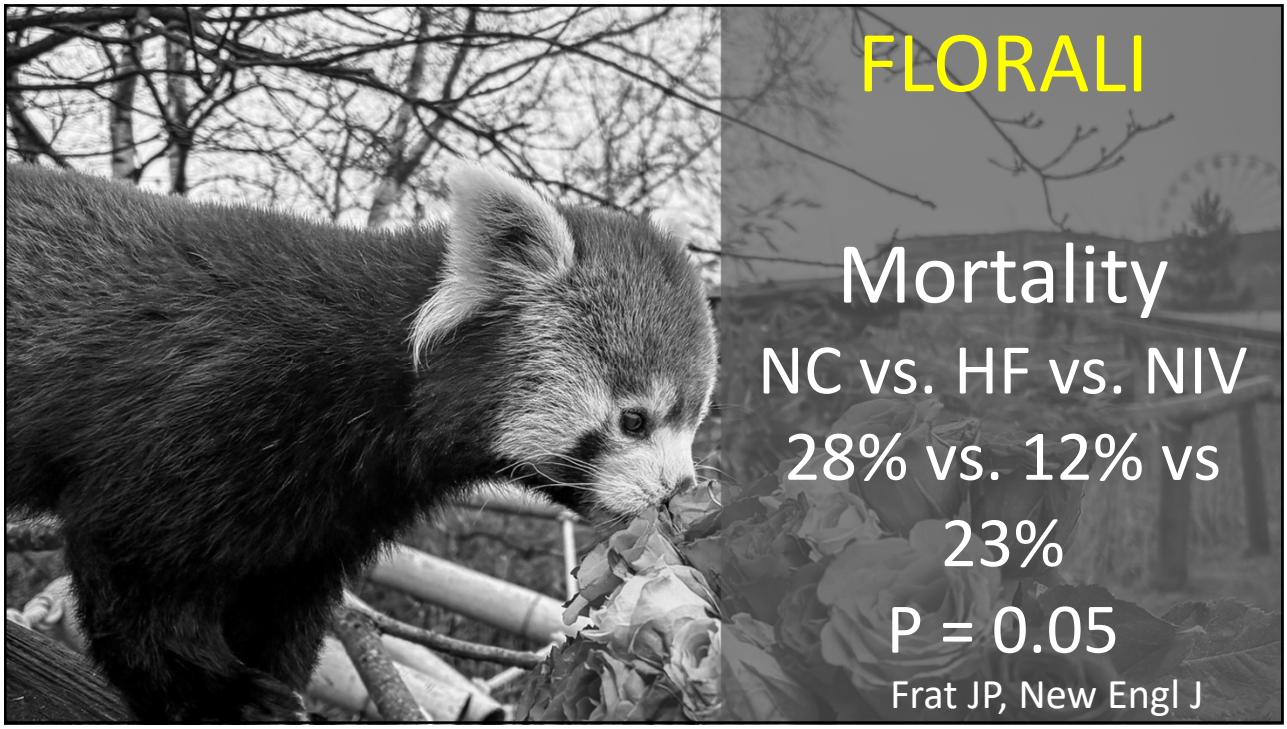
2° - Mortality

Frat JP, New Engl J

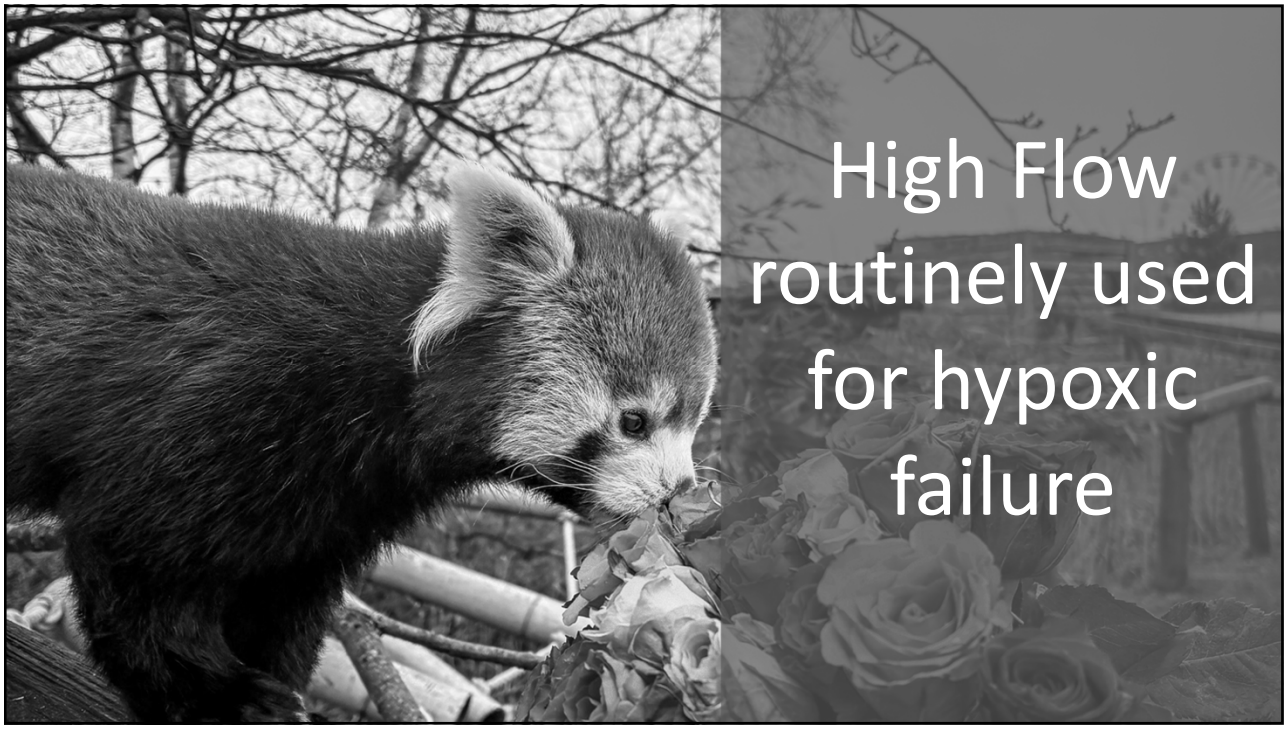
28


FLORALI
Intubation
NC vs. HF vs. NIV
47% vs. 38% vs 50%
P = 0.18
Frat JP, New Engl J

29


FLORALI
Mortality
NC vs. HF vs. NIV
28% vs. 12% vs 23%
P = 0.05
Frat JP, New Engl J

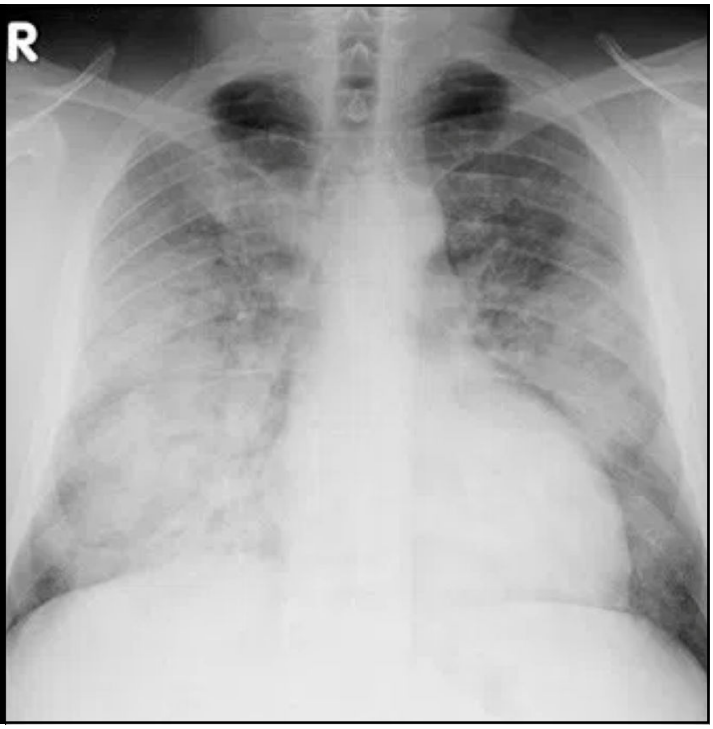
30



31

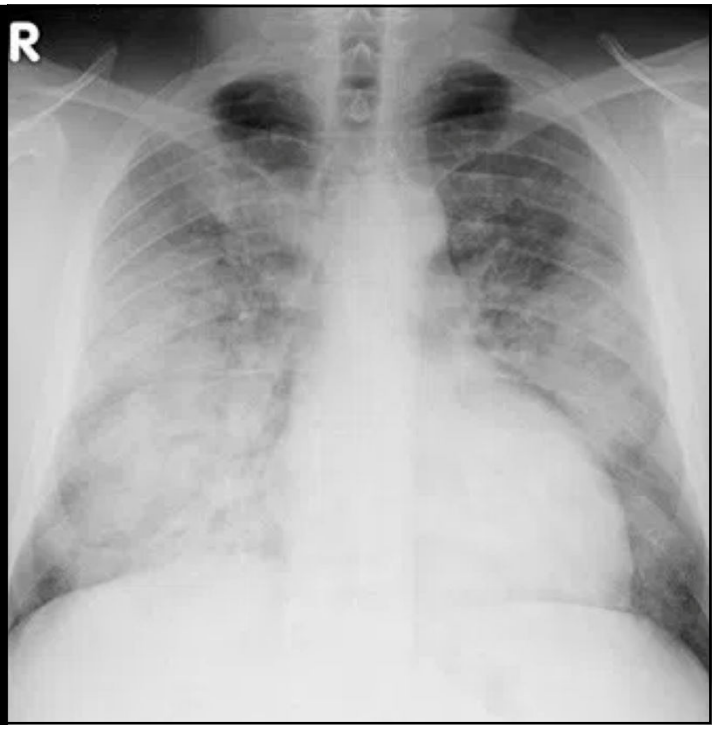
1 Hour Later

Placed on HFNO 50LPM + 60%



32

How do you sniff out failure?



33

34


ROX Index
SpO2/FiO2
RR
Roca O, J Crit Care

35


ROX Index
> 4.88
success
Roca O, J Crit Care

36

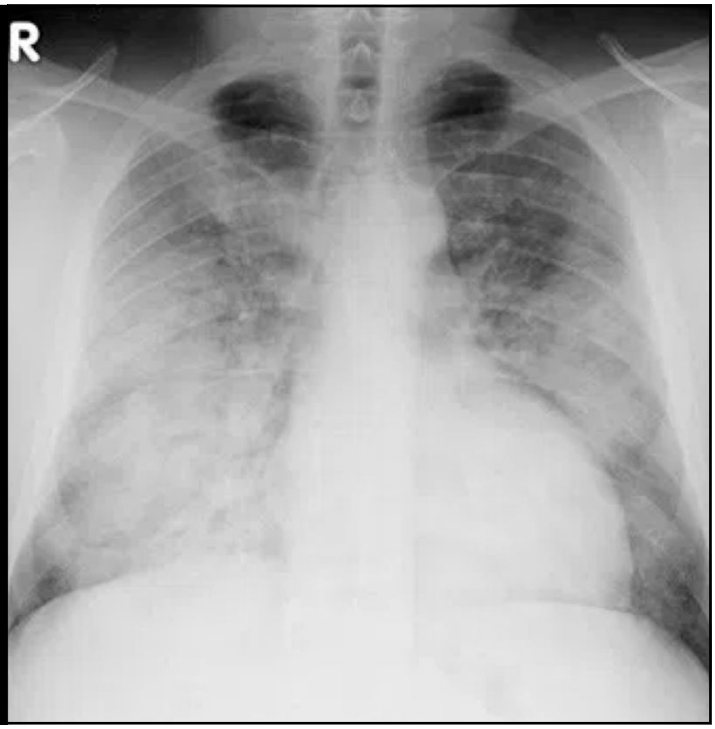

Failure?
2 hours
< 2.85
6 hours
< 3.47
Roca O, AJRCCM

37


ROX Index
2 hours
< 3
6 hours
< 3.5
Roca O, AJRCCM

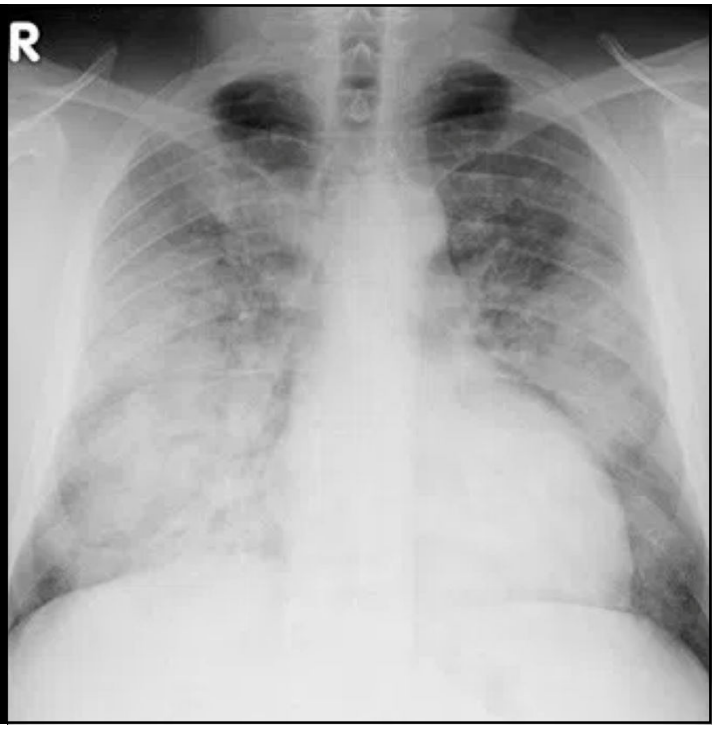
38

1 Hour Left
60 LPM + 80%
ROX Index 2.5

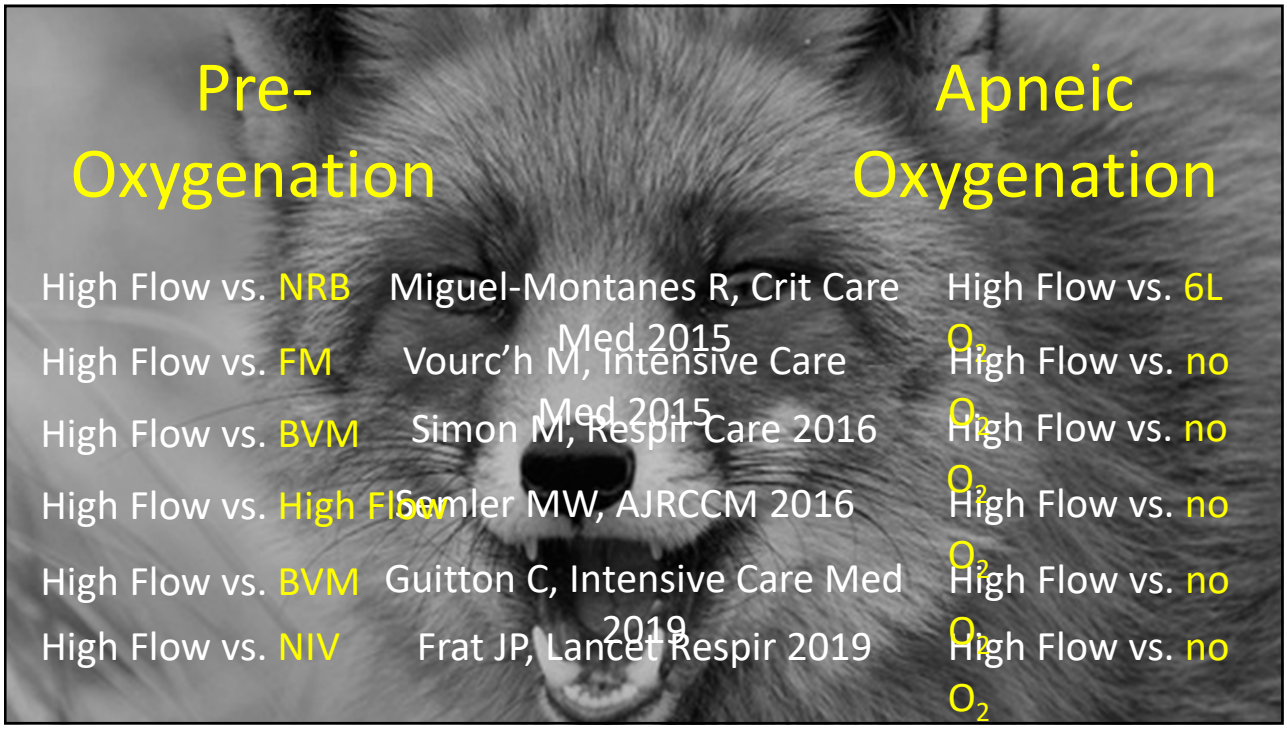


39

Intubate with
High Flow?



40


Pre-Oxygenation
Apneic Oxygenation
High Flow vs. NRB
Miguel-Montanes R, Crit Care Med 2015
High Flow vs. FM
Vourc'h M, Intensive Care Med 2015
High Flow vs. BVM
Simon M, Respir Care 2016
High Flow vs. High Flow
Semler MW, AJRCCM 2016
High Flow vs. BVM
Guitton C, Intensive Care Med 2019
High Flow vs. NIV
Frat JP, Lancet Respir 2019
High Flow vs. 6L O2
High Flow vs. no O2
High Flow vs. no O2
High Flow vs. no O2
High Flow vs. no O2
High Flow vs. no O2

41


Pre-Ox with NIV
Gibbs KW, N Engl J
+/- Apneic Ox with HFNC

42

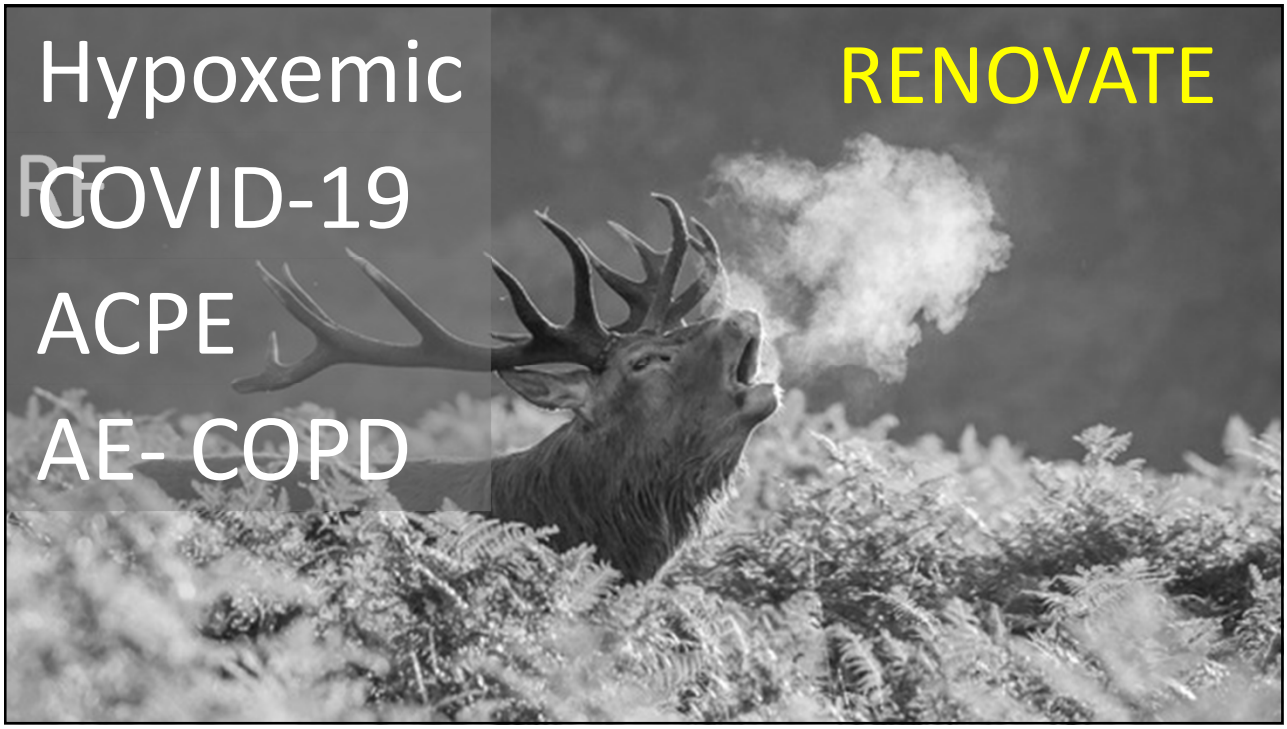
1 More to See

Respiratory distress

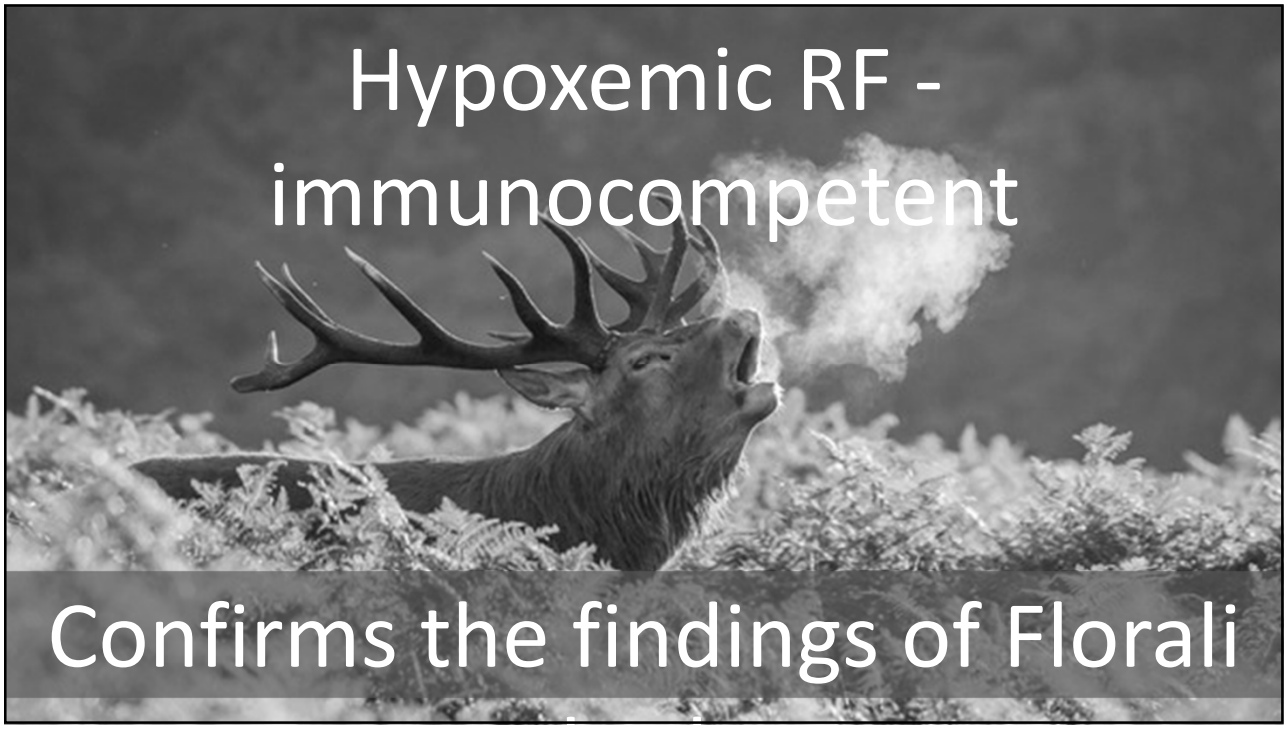
Wheezing

43

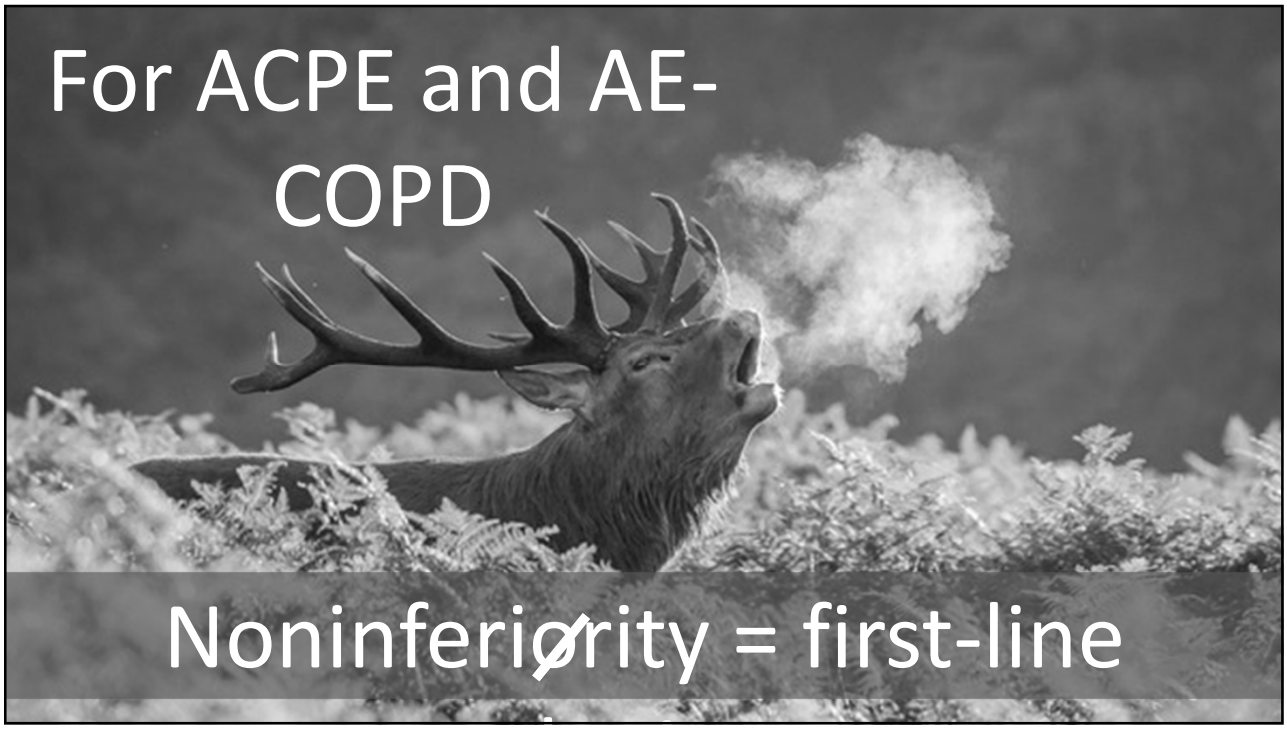
44


Hypoxemic
COVID-19
ACPE
AE- COPD
RENOVATE

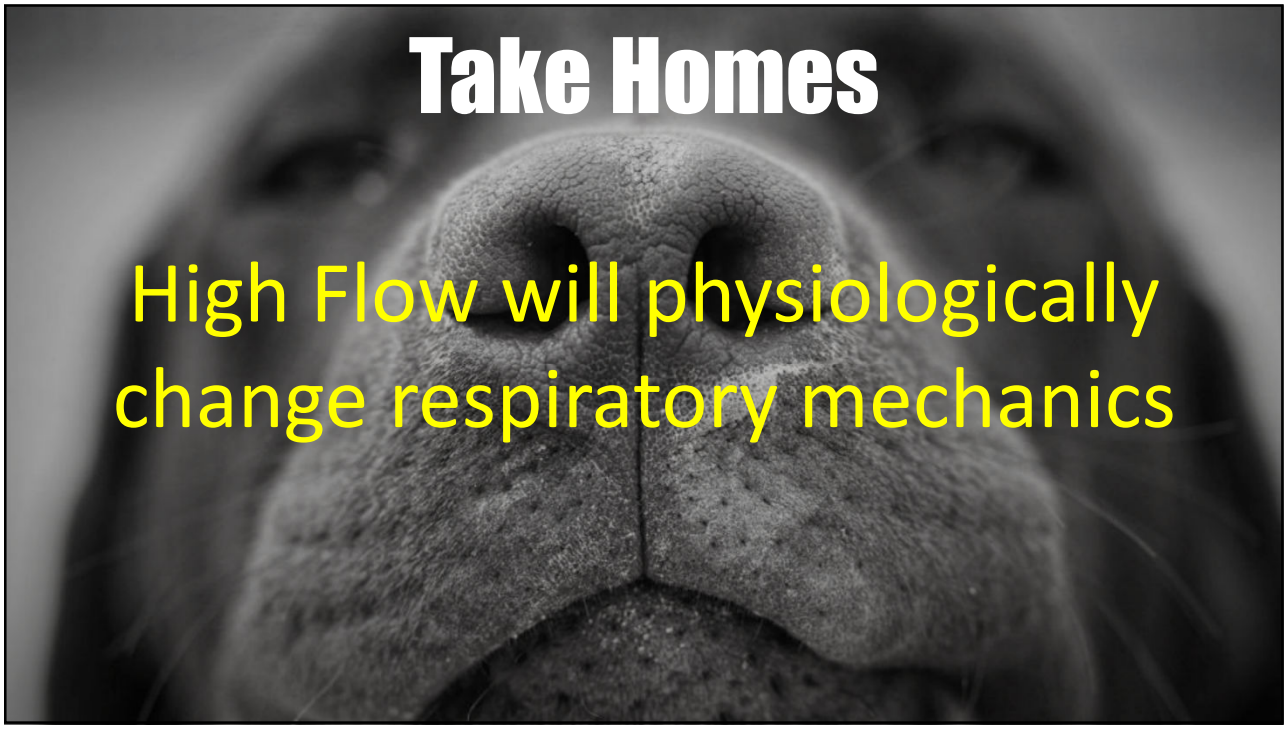
45


Hypoxemic RF -
immunocompetent
Confirms the findings of Florali

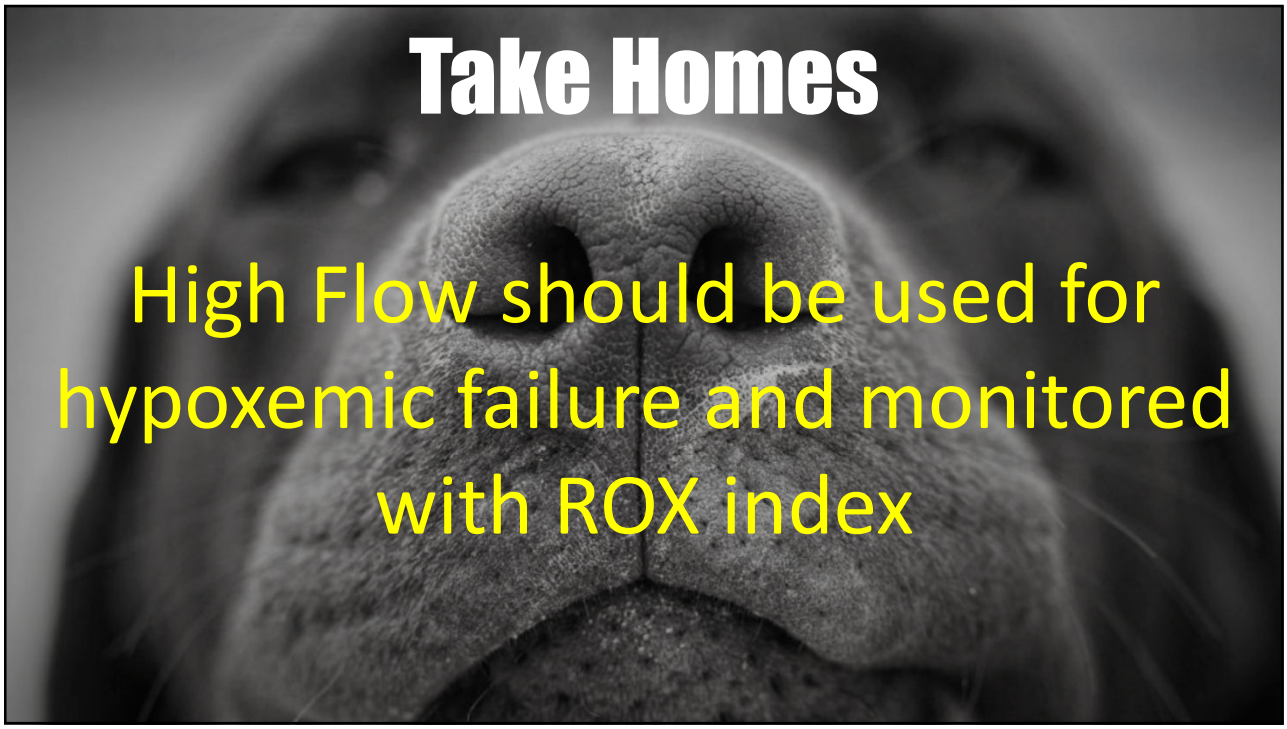
46


For ACPE and AE-COPD
Noninferiørity = first-line

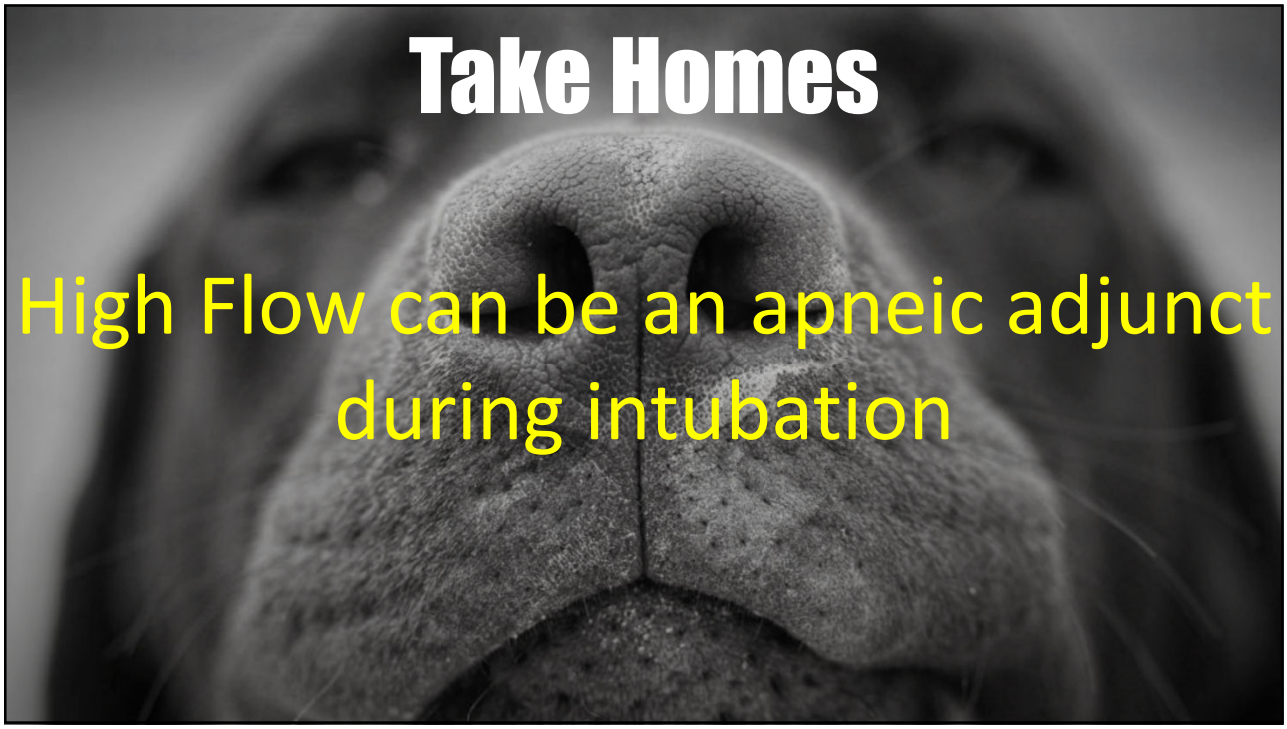
47


Take Homes
High Flow will physiologically change respiratory mechanics

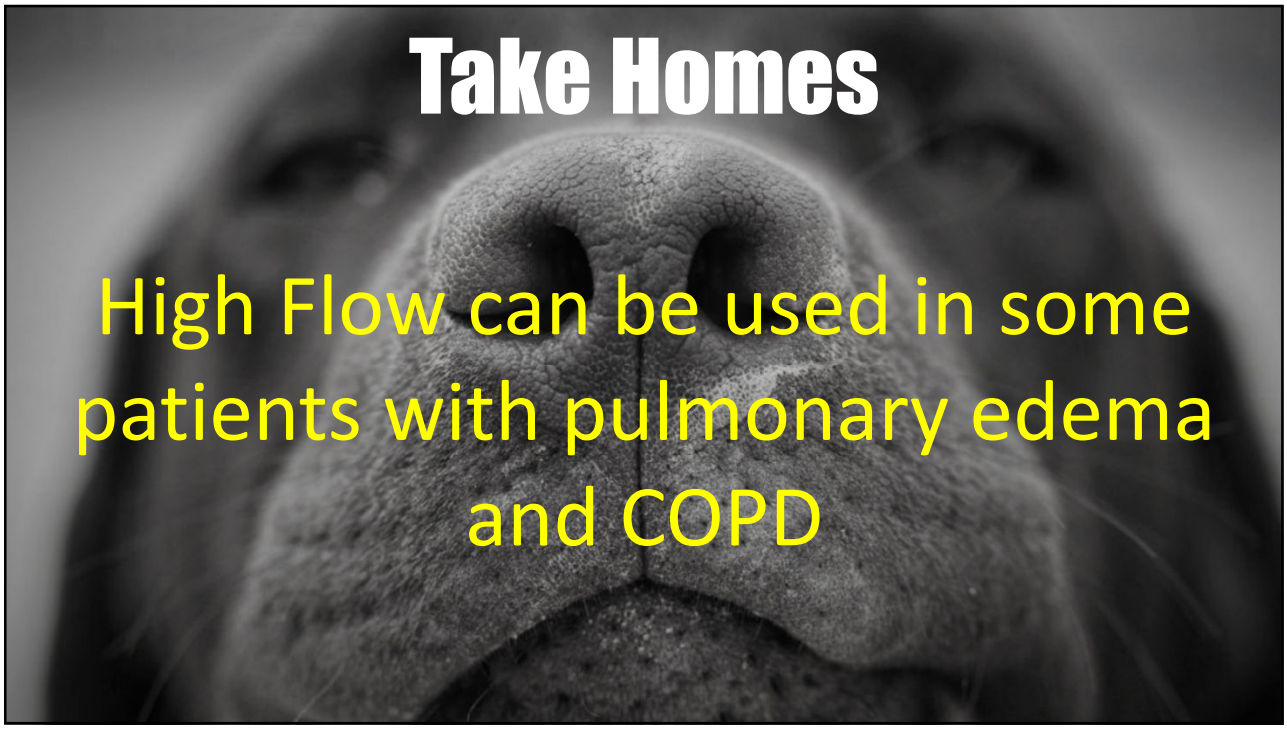
48


Take Homes
High Flow should be used for hypoxemic failure and monitored with ROX index

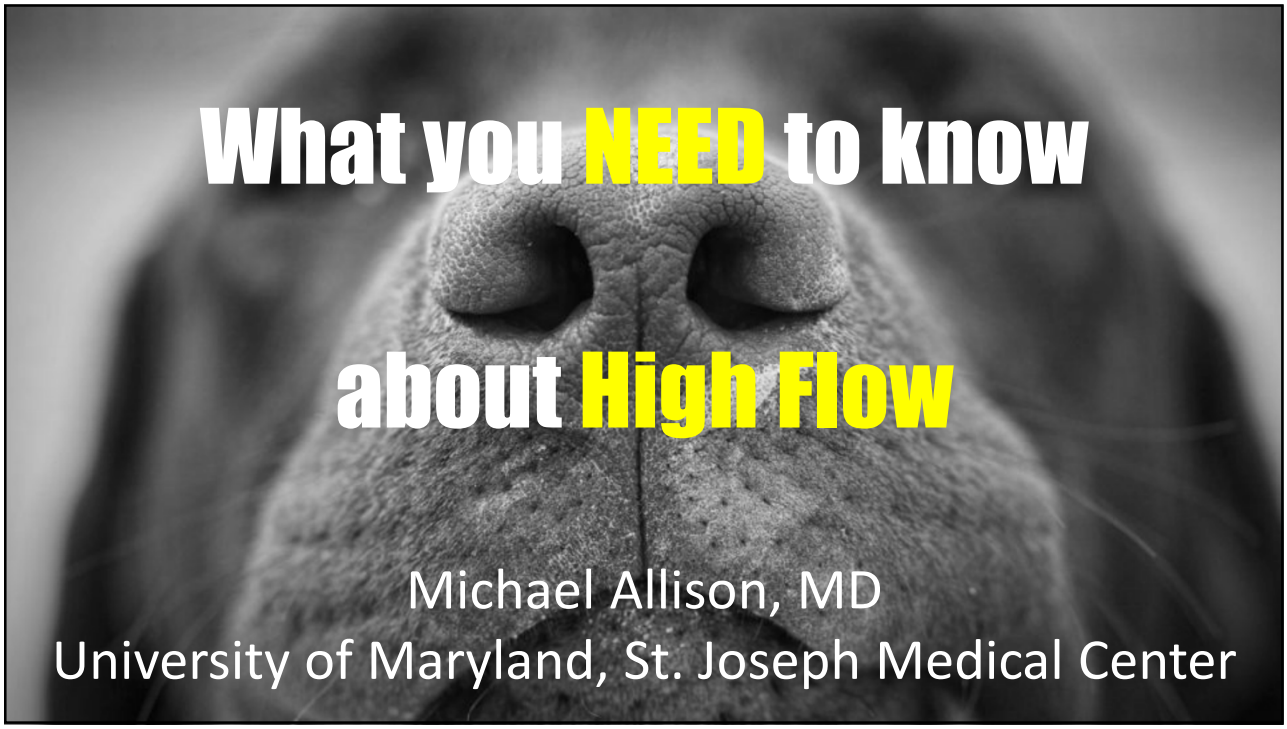
49


Take Homes
High Flow can be an apneic adjunct during intubation

50


Take Homes
High Flow can be used in some patients with pulmonary edema and COPD

51


What you NEED to know
about High Flow
Michael Allison, MD
University of Maryland, St. Joseph Medical Center

52