Pediatric Update on RSV, Flu and COVID

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Advocates for Families

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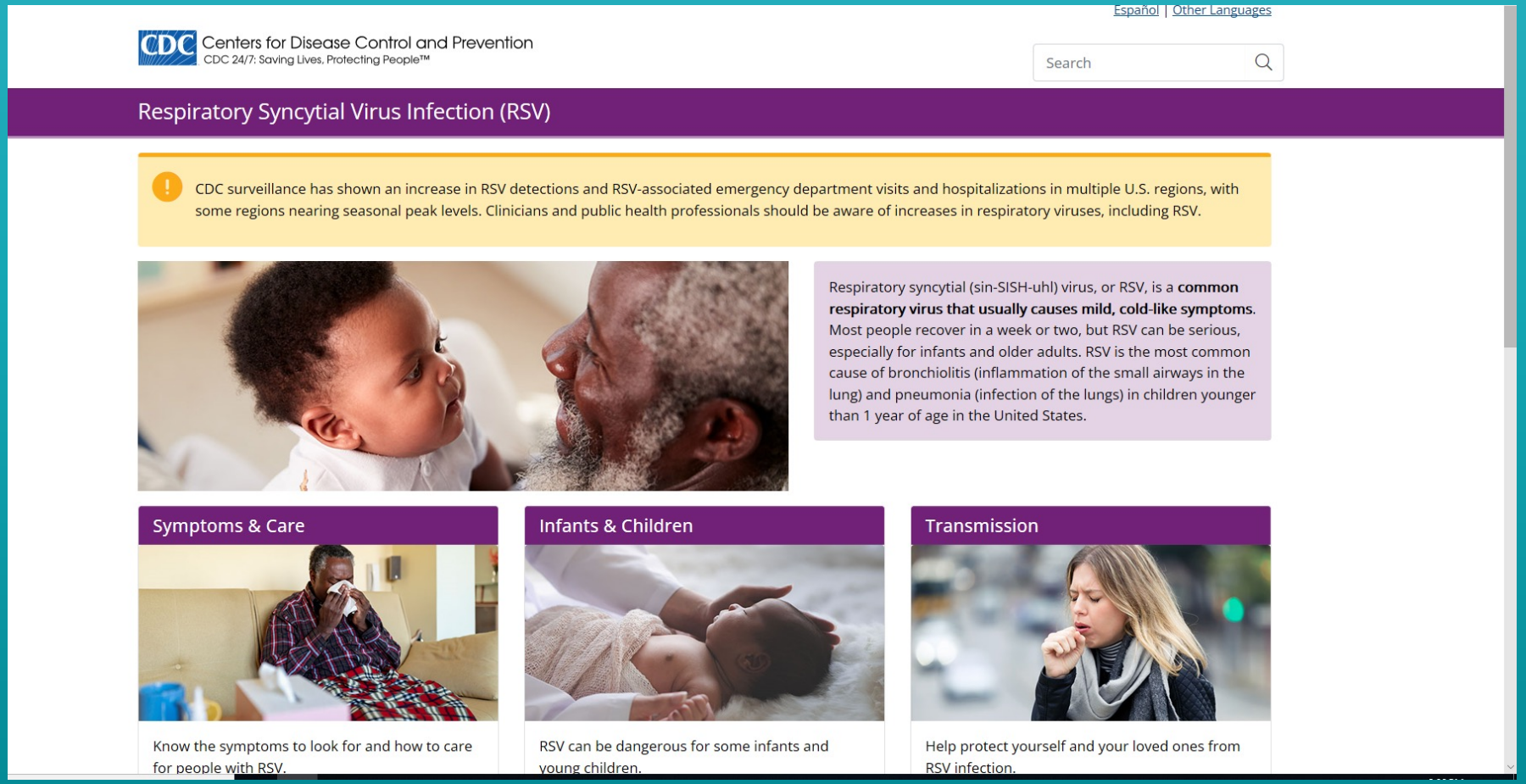
RSV: Transition from disease known as primarily in babies to increased awareness of adult illness



RSVandMe

Respiratory syncytial virus (RSV) is a contagious virus that is usually mild, but can severely affect the lungs and respiratory airways in **older adults**

While you may not have heard of it yet, RSV is not a new virus and may be more of a health concern than you think—even if you're healthy. And if you're aged 60 or older, you can get RSV.

https://www.rsvandme.com/?cc=ps_DHYUSHUVRB1479332&mcm=330002&gclid=37f606b0f7f71d23a3426528388535 9e&gclsrc=3p.ds&

RSV can pose an increased risk of hospitalization for older adults (65+) and adults with certain underlying conditions*

- Diabetes: 2.4 x or 6.4 x risk
- Coronary Artery Disease: 3.8 x or 6.5 x risk
- Chronic Obstructive Pulmonary Disease: 3.5 x or 13.4 x risk
- Asthma: 2.3 x or 2.5 x risk
- Congestive heart failure: 4 x or 7.6 x risk

*A prospective, population-based, surveillance study was conducted to estimate the incidence of RSV hospitalization among adults ≥18 years overall and those with specific comorbidities. Active and passive surveillance identified 1099 adults hospitalized with RSV in 2 geographical areas (Rochester and New York City) over 3 RSV seasons. The incident rate ratios presented above are not a range, but rather observations from 2 different locations comprised of the surveillance area. Estimated incidence rates for all comorbid conditions increased with age.
†Incidence rate ratio in Rochester for hospitalizations related to asthma was not considered to be statistically significant.

SEASONALITY

Figure 1. Countries covered by the review

Respiratory Syncytial Virus Seasonality: A Global Overview

J Infect Dis, Volume 217, Issue 9, 1 May 2018, Pages 1356–1364, https://doi.org/10.1093/infdis/jiy056

Previous years, RSV is “red hot” in the US in December, January, February and early March

To our knowledge, this is the first study to use original-source, high-quality data relying predominantly on the official information gathered by the different surveillance networks to establish a global report on country-specific RSV seasonality

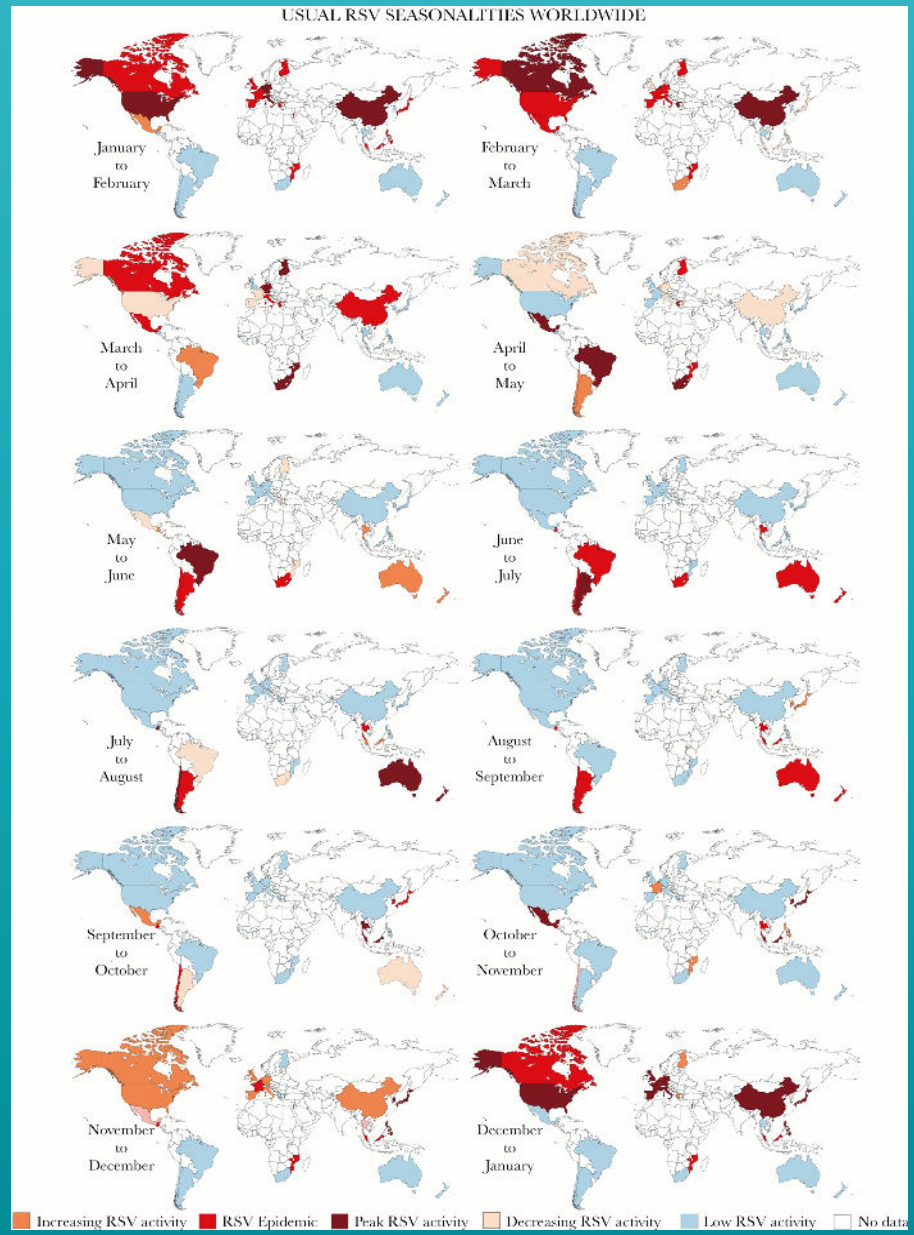


Figure 2. Country-specific respiratory syncytial virus (RSV) epidemiology. Some countries have >1 peak month

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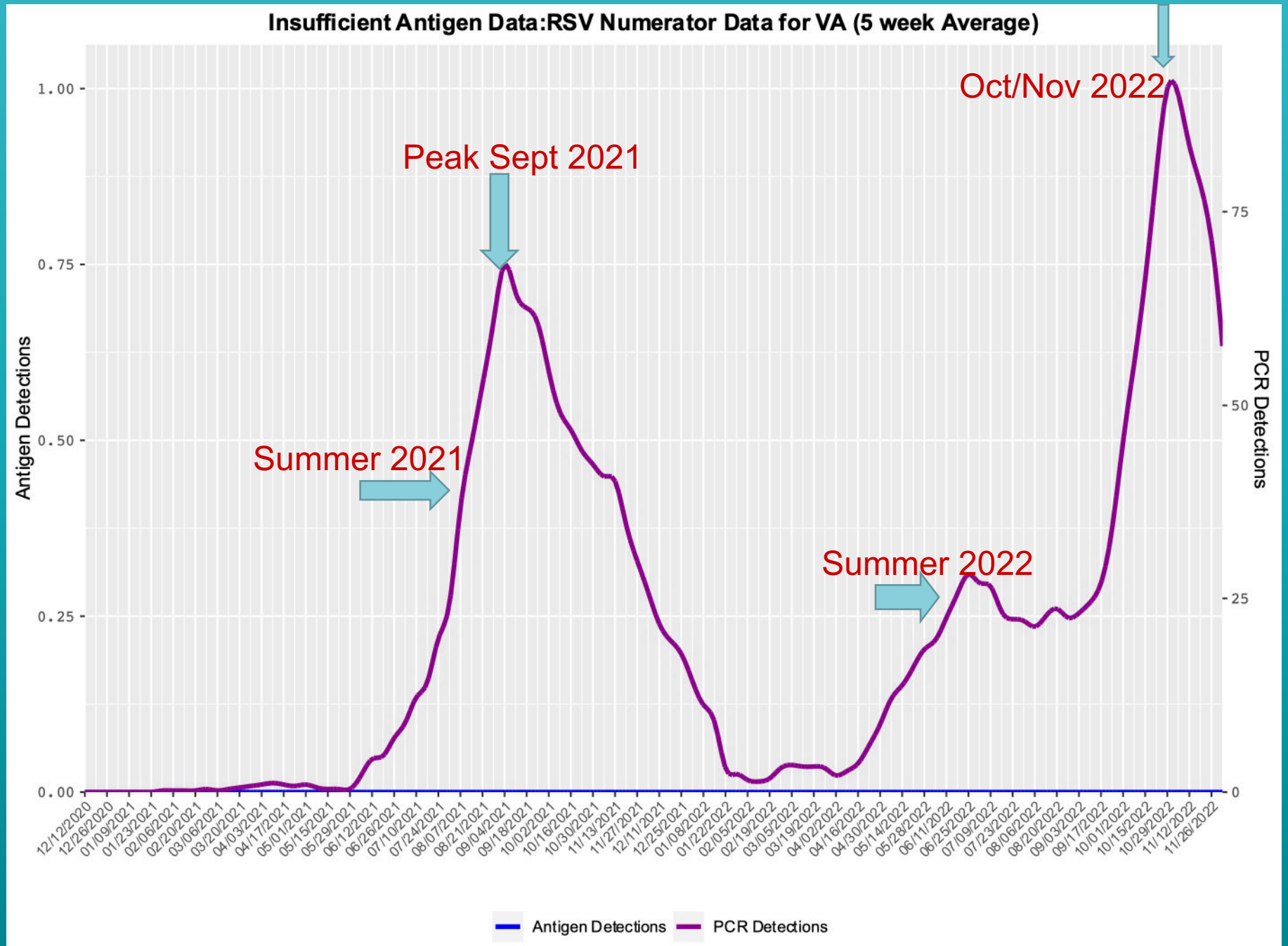
VA

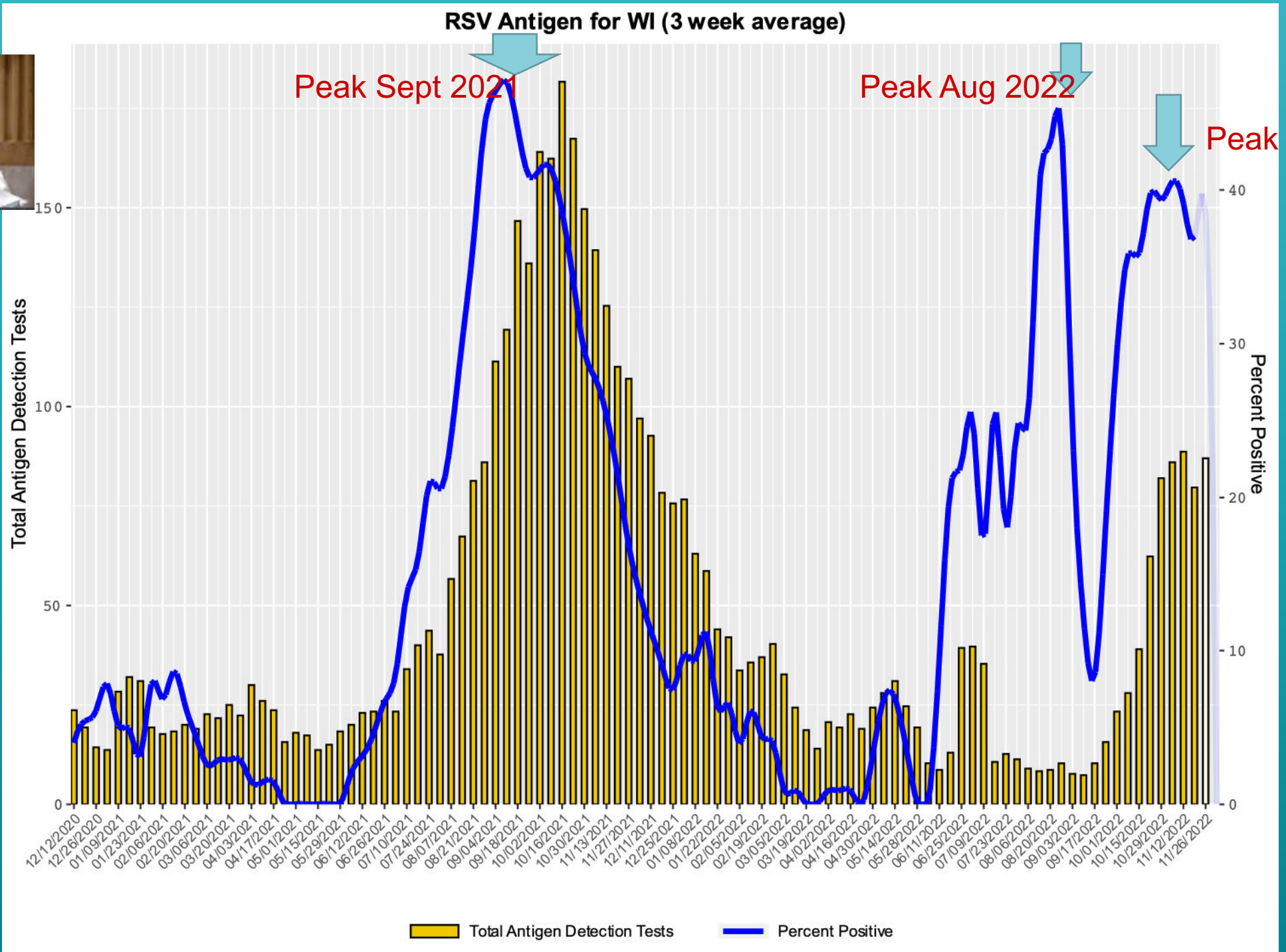
Paul E. Marik, MD, FCCP, FCCM has teaching awards from every institution where he has worked. Since his arrival at EVMS in 2009, he has received five awards, including the Teacher of the Year Award from the Virginia chapter of the American College of Physicians (ACP). In March 2017, he will add his most prestigious award yet: the ACP Award for Outstanding Educator of Residents and Fellows.



Wisconsin

In a long line of medical conspiracy theories, ivermectin is the latest to seduce many…

Jan 2022 Comment about sworn Congressional testimony



Timeline trends

Globally, RSV epidemics started in the south and moved to the north. We found that the RSV wave started in most countries in the Southern Hemisphere between March and June and in countries in the Northern Hemisphere between September and December

	start	peak	end	length	years
North America					
Canada	46–49	52–8*	15–18	20–22	2012–2017
United States	44–46	52–4*	12–14	21–23	2011–2017

https://academic.oup.com/jid/article/217/9/1356/4829950

Hospital financial decisions play a role in the critical shortage of pediatric beds for RSV patients

Read in Kaiser Health News:
https://apple.news/AYjdgMSrPS0uM5945U6LX1Q

Yes, the U.S. is experiencing an unusual spate of childhood RSV infections. But the critical shortage of hospital beds to treat ailing children stems from structural problems in pediatric care that have been brewing for years.

- "Hospitals rely on high-volume, high-reimbursement procedures from good payers to make money. There's no incentive for hospitals to provide money-losing services." - Dr. Scott Krugman, vice chair of pediatrics at the Herman and Walter Samuelson Children's Hospital at Sinai in Baltimore.
- The number of pediatric inpatient units in hospitals fell 19% from 2008 to 2018, according to a study published in 2021 in the journal Pediatrics. Just this year, hospitals have closed pediatric units in Boston and Springfield, Massachusetts; Richmond, Virginia; and Tulsa, Oklahoma.

Lynchburg VA pediatric beds:

2022: 12

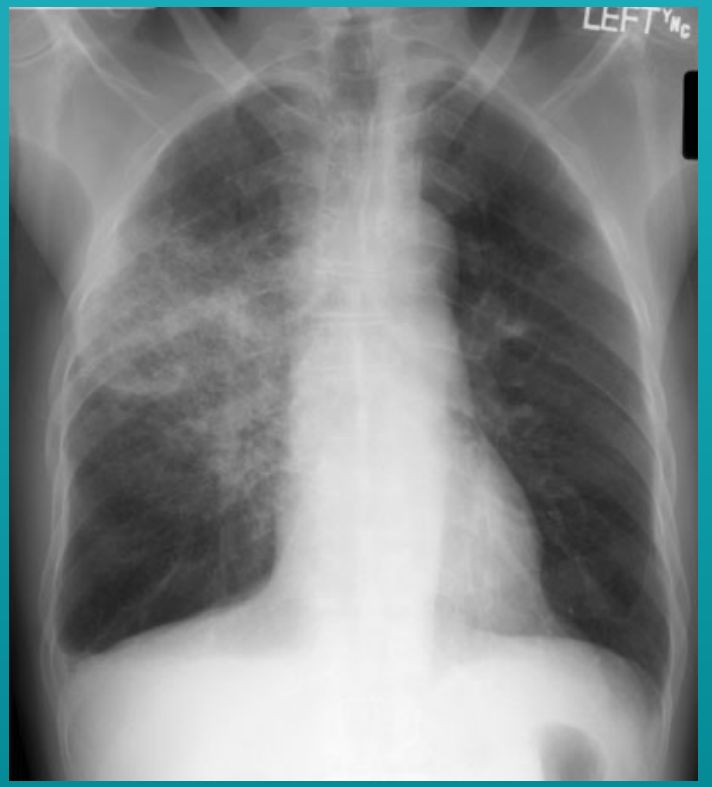
1990's: 28

During the COVID pandemic, our pediatric unit was full of suicidal patients, NOT for COVID illness

Flu and RSV virtually disappeared during lockdowns and school closures

Children did not spread their usual respiratory illnesses (average 10/year if in day care and Standard American Diet - SAD)

Infants and toddlers lost their opportunity to modulate their immune system by exposure to multiple low risk viruses



Naso-oropharyngeal hygiene

Challenges of nasal sprays in kids

- Infants: use of NoseFrida
- Toddlers: 2 parents to hold
- > 4-year-old: Can demonstrate and practice sniffing for bribes

Saline nose drops are useful in kids

NoseFrida the Snot Sucker

Mouthwashes

Challenging under age 3 years

- The first 1,000 days are crucial for establishing oral tolerance and diverse gut flora as foundation for excellent immune function
- Promote dogs licking babies and toddlers eating dirt

Over 3 years

- Make it a game to learn to gargle
- Give a pleasant-tasting chaser if needed
- Good luck with 3 times a day

The Common Cold – Herbs

- **Echinacea** – immune modulation; increases in TNF, IgM, lymphocytes
  - Decreased symptoms & increased WBC, NK function

    Placebo-controlled trial (Goel et al, Phytother Res, 2005)
  - Decreased duration illness (Schulten, Arzneimittelforschung, 2001)
  - Controversy regarding efficacy - related to preparation,

    part of plant (aklomides concentrated in root

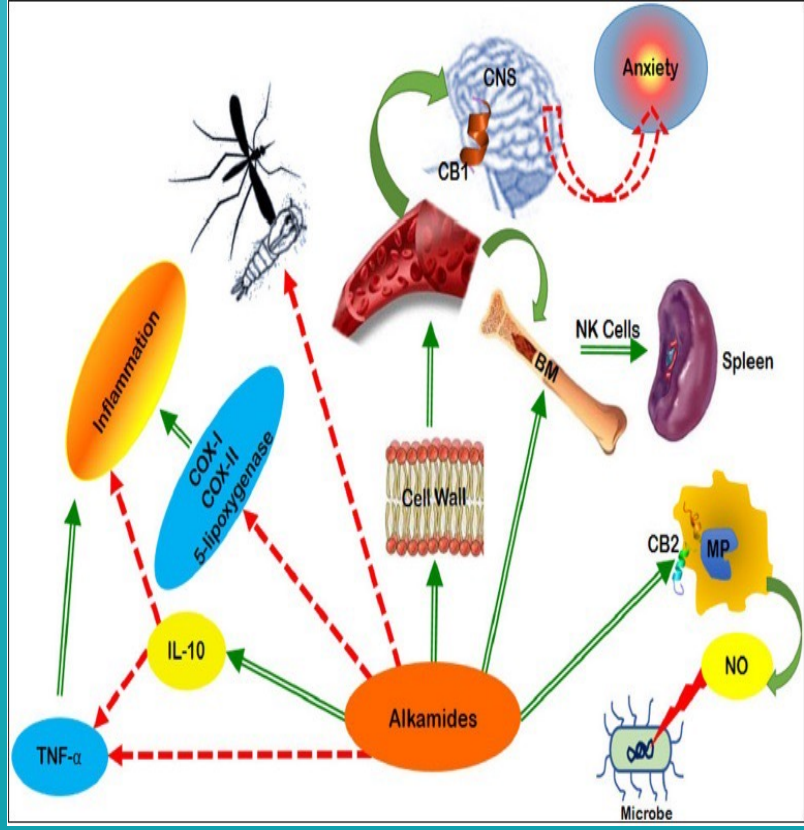
    may have greater immunomodulatory effect)

    (Manayi et al, Pharmacogn Rev, 2015)
- **Elderberry** – neutralizes hemagglutinins;

  enhance cytokine production
  - Improvement in symptoms and earlier resolution

    (Zakay-Rones et al, J Int Med Res, 2004)
- **Garlic** – decreases duration of symptoms
  - Raw or baked/roasted cloves
  - Supplements (with parsley to reduce regurgitation, bad breath)

    (Josling et al, Adv Ther, 2001)



The Common Cold – More Herbs

Oregano oil (Thymol and carvacrol)

- Promotes sweating
- Antiviral, antibacterial anti-inflammatory properties
- Aromatic herbs including Oregano showed significant immediate decrease in symptoms (Ben-Ayre et al, Evid Based Comp Alt Med, 2011)

Licorice

- Licoricidin – most activity vs bacterial pathogens (Tanaka et al, J Nutr Sci Vitamin, 2001)
- Anti-inflammatory effects – decrease sore throats (Agarwal et al, Anesth Analg, 2009)

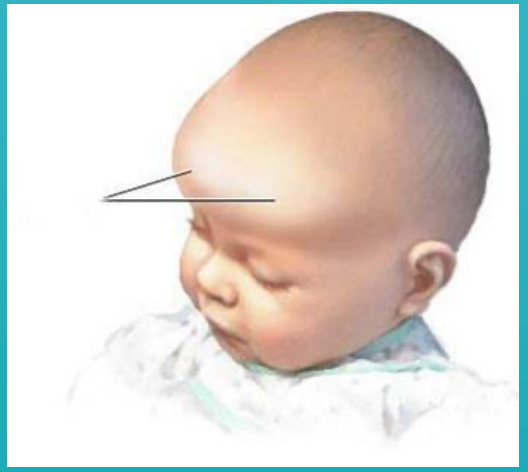
Andrographis

- Production of cytokines and immune activation markers in WBCs

  (Panossian et al, Phytomed, 2002)
- Decreased severity and duration of symptoms

  (Kulichenko et al, J Herb Pharm, 2003)

Upper respiratory infections – Nutritional supplements



Vitamin A – decreases number of colds; decreases mortality measles & HIV

- Sweet potatoes, carrots, dark leafy greens, winter squashes, lettuce, dried apricots, bell peppers, fish, liver, and tropical fruits (Villamor et al, Clin Microbiol Rev, 2005)

Vitamin D – meta-analysis - reduction in URI (Charan et al, J Pharm Pharmacother, 2012); high dose does not prevent URI (Aglipay et al, JAMA, 2017)

- Sunlight
- Fatty fish (tuna, mackerel, salmon) liver, cheese, egg yolks

* A note about Vitamin D lab levels in pediatrics

Upper respiratory infections– Nutritional supplements

Echinacea, Propolis, Vitamin C (Chizukit) - Prevention

- Decrease in number and duration of colds vs. placebo

  (Sangvai et al, Arch Ped Adolesc Med, 2004)

Zinc – reduced duration and number of URI; Prevention (Kurugol et al, Acta Paed, 2006; Prasad et al, J Infec Dis, 2008)

- Supplement – best taken, alone, at night; absorbable forms such as picolinate, acetate important
- Lamb, beef, pumpkin seeds, chickpeas, cashews, kefir, mushrooms, spinach, cocoa powder, chicken

Zinc: deficiency almost universal in toddlers and elementary school kids

Zinc picolinate
Liquid

Infants: 10 mg bid
to start w food
Toddlers & elementary:
10-25 mg bid w food
to start

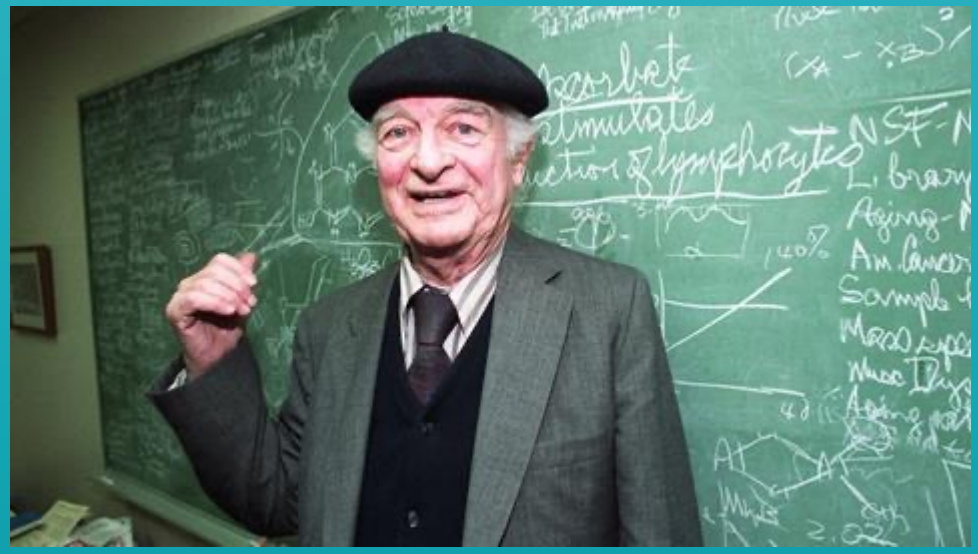
Adolescents: I have
gone as high as 100
mg/day, always with food

Zinc taste test

Vitamin C in pediatrics

Oral doses: risk diarrhea

- Infants < 1 yo: divide into multiple doses per day, 100-250mg, give with food
- Toddlers 1-3 yo: multiple doses per day, 250-500 mg at a time, give with food
- Children & adolescents: up to 4000/day if divided in small enough doses with food
    - Mumper clinical experience



Vitamin C – decrease duration & severity of colds;

Prevention (Douglas et al, Cochrane Syst Rev, 2004)

Sources: Oranges, kiwi, bell peppers, strawberries, papaya, broccoli, brussels sprouts, kale and guava

50% reduction in incidence in subgroup under significant physical stress (soldiers, skiers, marathon runners) (Hemila et al, Mil Med, 2004)

Treating Upper Respiratory Infections– Other options

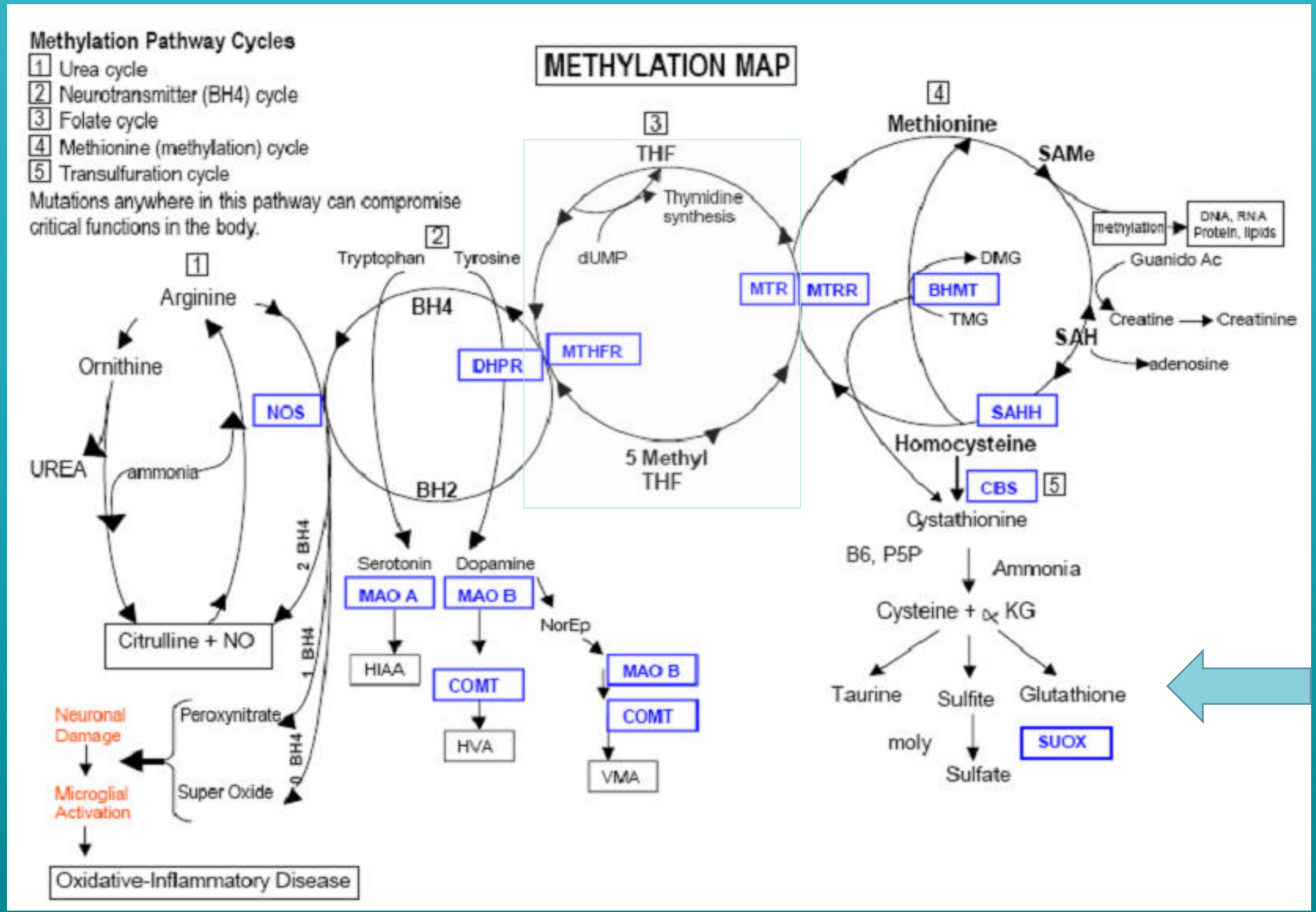
Zinc +/- Vitamin A (Kartasurya et al, British J of Nutr, 2012)

Probiotics (Leyer et al, Pediatrics, 2009)

- Decrease incidence URI by 34% (Lactobacillus GG) (Hojsak et al, Clin Nutr, 2010)
- Short-term use after exposure reduces severity and duration of illness (Gerasimov et al, Eur J Clin Nutr, 2016)

N-acetyl cysteine

- Decreases flu symptoms (duration and severity) and improves immunity
- Inhibits and disrupts biofilm formation (Biasi et al, Respir Med, 2016)
- Anti-oxidant
- Anti-inflammatory
- Immune modulation
- Gateway to detox through GSH
- Can oxidize – recommend blister packs


Methylation Pathway Cycles
1 Urea cycle
2 Neurotransmitter (BH4) cycle
3 Folate cycle
4 Methionine (methylation) cycle
5 Transulfuration cycle
Mutations anywhere in this pathway can compromise critical functions in the body.
METHYLATION MAP
1
Arginine
Ornithine
UREA
ammonia
NOS
Citrulline + NO
2
Tryptophan
Tyrosine
BH4
BH2
DHPR
MTHFR
3
THF
Thymidine synthesis
dUMP
5 Methyl THF
MTR
MTRR
4
Methionine
SAMe
methylation
DNA, RNA Protein, lipids
DMG
BHMT
TMG
Guanido Ac
Creatine
Creatinine
SAH
adenosine
SAHH
Homocysteine
CBS
5
Cystathionine
B6, P5P
Ammonia
Cysteine + ∝ KG
Taurine
Sulfite
Glutathione
moly
Sulfate
SUOX
2 BH4
1 BH4
0 BH4
Serotonin
Dopamine
MAO A
MAO B
HIAA
COMT
HVA
NorEp
MAO B
COMT
VMA
Neuronal Damage
Microglial Activation
Peroxynitrate
Super Oxide
Oxidative-Inflammatory Disease

The Common Cold
What Not to Use in Children

- Antihistamines
  - No more effective than cherry syrup in relieving congestion
  - Drowsiness, paradoxical irritability and agitation
- Antibiotics: do not work for viruses; overprescribed
- Decongestants – increased heart rate, potential psychosis
- Cough Suppressants – sleepiness, addiction, caution respiratory depression
- Aspirin – potential Reye's syndrome
- **Acetaminophen – suppression of glutathione and immune function**

Pediatric limitations on adult protocol items

Nitazoxanide NTZ (Alinia brand name)

- Excellent experience as antiparasitic for autism patients (Mumper clinical experience)
- Price in US often limits use in young families
- Not necessary if doing many of the above options

Ivermectin

- Difficult to get from pharmacies and expensive
- Clinical data for flu or RSV lacking in pediatrics
- Many pediatricians and family docs have been biased against it due to government and media propaganda