


**B C V C** Bristol Childrens Vaccine Centre

## Childhood influenza vaccination also protects against disease in adults


*Adam Finn*  
*@adamhfinn*

Dubrovnik 9<sup>th</sup> September 2017



**B C V C** Interests statement


- Chair, WHO Euro TAGE - ex officio WHO SAGE
- Member UK DoH JCVI & subcommittees (Pneumo, HPV, Varicella)
- Research projects funded by Pfizer & GSK
- Current vaccine-related consultancy funded by industry concerns HepB, pertussis, klebsiella & pseudomonas vaccines - where paid, income is paid to employers
- No other benefits (travel, hotels, registration etc.) from industry
- No pharma shares or IP



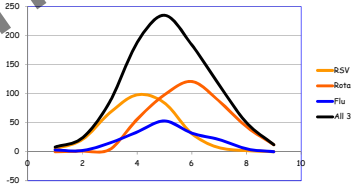
**B C V C** Flu - why the fuss?

- Significant annual epidemics with morbidity and resources usage especially in the young and the elderly and mortality in the elderly
- Risk of global pandemics and related Armageddon scenarios


See @cambridgeMG



**B C V C** Peak times..




Month	RSV	Rota	Flu	All 3
0	0	0	0	0
2	10	0	0	10
4	100	0	0	100
5	150	100	0	250
6	50	50	50	150
8	0	0	0	0
10	0	0	0	0



**B C V C** Old idea - direct protection


- Immunise the elderly
- Immunise high risk groups, including pregnant women
- Stop them getting sick and dying



**B C V C** Europe - universal flu Recommendations for kids

- Austria - IIV - 7m to 15y RbnF
- Finland 6m-3y - IIV & LAIV **funded**
- Latvia IIV 6m-2y **funded**
- Malta - IIV 6m-5y RbnF
- Poland IIV 13m-19y RbnF
- Slovakia IIV 6m-12y **funded**
- Slovenia IIV 6m-2y RbnF
- UK 2y-7y LAIV **funded**
- LAIV in Germany Sweden Norway


<http://vaccine-schedule.ecdc.europa.eu/Pages/Scheduler.aspx>



**B V C**

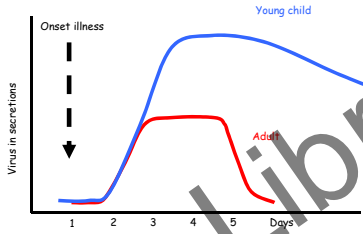

### New idea - indirect protection

- Immunise children universally
- Block transmission of flu
- Protect not only those at high risk but also much larger low risk group...

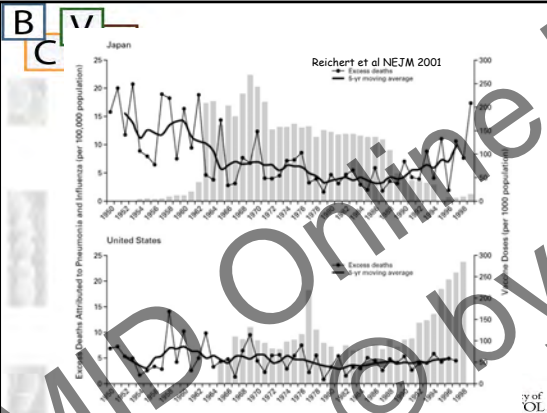


**B V C**

### Infectiousness





**B V C**



Reichert et al NEJM 2001

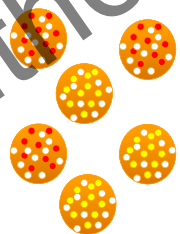
Lee et al 2010 JAMA




**B V C**

### Cluster randomised study

- \* Isolated Hutterite communities in Canada
- \* 950 children aged 3-15y in 50 communities
- \* Randomised to TIV or HepA vaccines
- \* 2300 unimmunised people studied for flu
- \* 3.1% of unimmunised people in immunised communities got PCR+ flu vs 7.6% in unimmunised communities (61% effective)




Leeb et al 2010 JAMA




**B V C**

### "New" vaccine - LAIV

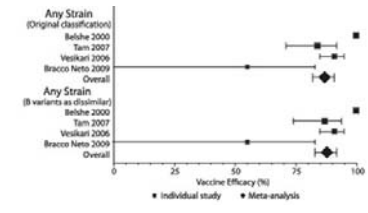


- Nasal spray - high acceptability
- Efficacious in young children (but only licensed for >2y)




**B V C**

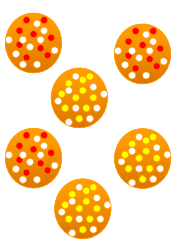
### Efficacy of LAIV Relative to Placebo



Ambrose et al., *Vaccine*, 30:886-892, 2012.




**B V C** **Second Hutterite Cluster randomised study**




- \* 3 season study 2012-15
- \* 1186 children aged 36m-15y in 52 communities
- \* Randomised to IIV (72%) or LAIV (77%) vaccines (both trivalent)
- \* Children & 3425 unimmunised people studied for flu A&B (PCR)
- \* 5.3% of people in LAIV immunised communities got PCR+ flu vs 5.2% in IIV immunised communities (Hazard ratio 1.03 (0.85-1.24))

Loeb et al 2016 Annals Internal Medicine




**B V C** **England/UK - universal LAIV**

- 2013-14 Introduced for 2 year olds - changed to 2-3 year olds (1 dose each). Primary school children (5-10 yo in pilot areas)
- 2014-15 2-4 year olds 1 dose. More pilots including secondary schools (11+)
- 2015-16 2-7 year olds.
- 2017-18 2-9 year olds




**B V C** **School pilot schemes 2014-15 England**

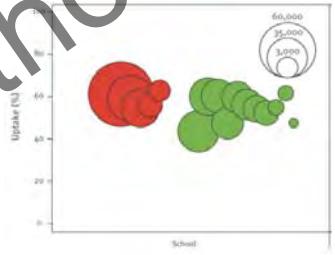


- 2014-15 (year 2)
- Large seasonal epidemic
- Mostly H3N2 then B
- Both significantly drifted from vaccine strains


Pebody et al Eurosurveillance Oct 2015



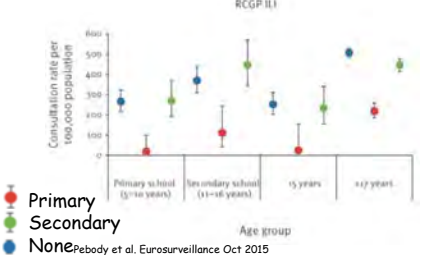
**B V C** **Coverage in schools**




Pebody et al. Eurosurveillance Oct 2015



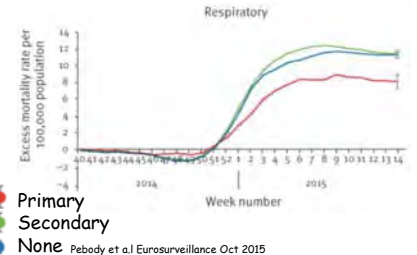
**B V C** **GP diagnosed ILI**




Pebody et al. Eurosurveillance Oct 2015

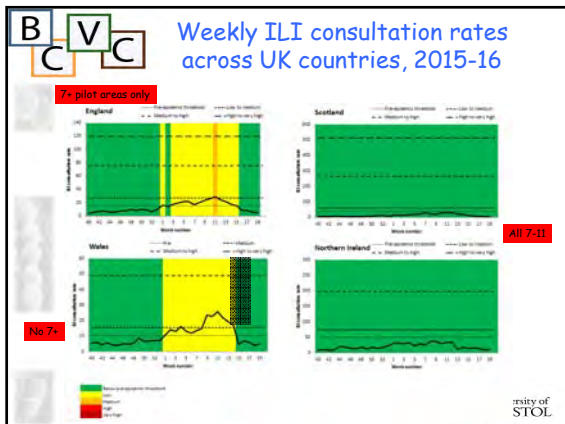


**B V C** **Excess respiratory mortality**



Pebody et al Eurosurveillance Oct 2015





### 2016-2017 LAIV effectiveness

Table: Adjusted influenza vaccine effectiveness (VE) against medically-attended laboratory confirmed influenza by age group and influenza type in 2016/17, UK.

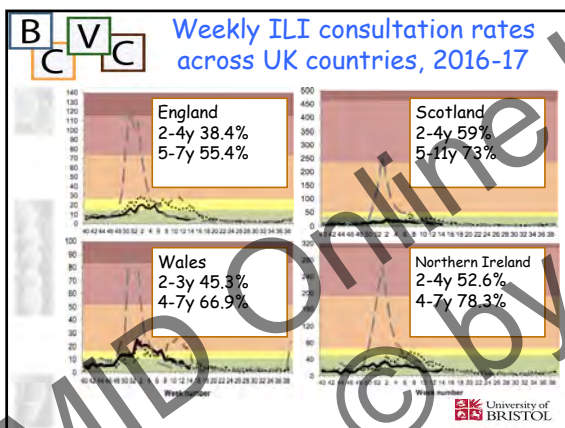
Age-group	A(H3N2) adjusted* VE (95% CI)	Flu B adjusted VE (95% CI)	Flu A and B adjusted VE (95% CI)
2-17 years (LAIV only)	57.0 (7.7, 80.0)	78.6 (-86.0, 97.5)	65.8 (30.3, 83.2)

CI: confidence interval; VE: vaccine effectiveness.

\*Adjusted for age-group, sex, month, pilot area and surveillance scheme.

Public Health England

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Disease	Transmission	R <sub>0</sub>
Measles	Airborne	12-18
Diphtheria	Saliva	6-7
Smallpox	Airborne droplet	5-7
Polio	Fecal-oral route	5-7
Rubella	Airborne droplet	5-7
Mumps	Airborne droplet	4-7
HIV/AIDS	Sexual contact	2-5
Pertussis	Airborne droplet	5.5 <sup>[2]</sup>
SARS	Airborne droplet	2-5 <sup>[3]</sup>
Influenza (1918 pandemic strain)	Airborne droplet	2-3 <sup>[4]</sup>
Ebola (2014 Ebola outbreak)	Bodily fluids	1.5-2.5 <sup>[5]</sup>

H1N1 now 1.4

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### 5 reasons to vaccinate your child against flu

- Flu is a common and effective virus that can be passed on to other people.
- Flu can be a really tricky bug that can lead to a hospital admission for children with other medical conditions, like heart disease and asthma.
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For more information visit [www.nhs.uk/flu](http://www.nhs.uk/flu)

Flu (immunisation) 2016/17

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