www.freewebs.com/edward_jenner/the_cow_pock_large_cartoon.jpg

Impact of Vaccine Hesitancy and Strategies to Increase Immunization Uptake

Noni MacDonald MD, FRCPC
Dalhousie University,
Canadian Centre for Vaccinology
Halifax , Canada

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Conflicts of Interest

No relationship with commercial interests

i.e. no conflicts of interest

- Noni MacDonald:

  professor, Dalhousie University, Halifax Canada,

  consultant and adviser to WHO EURO, SEARO and

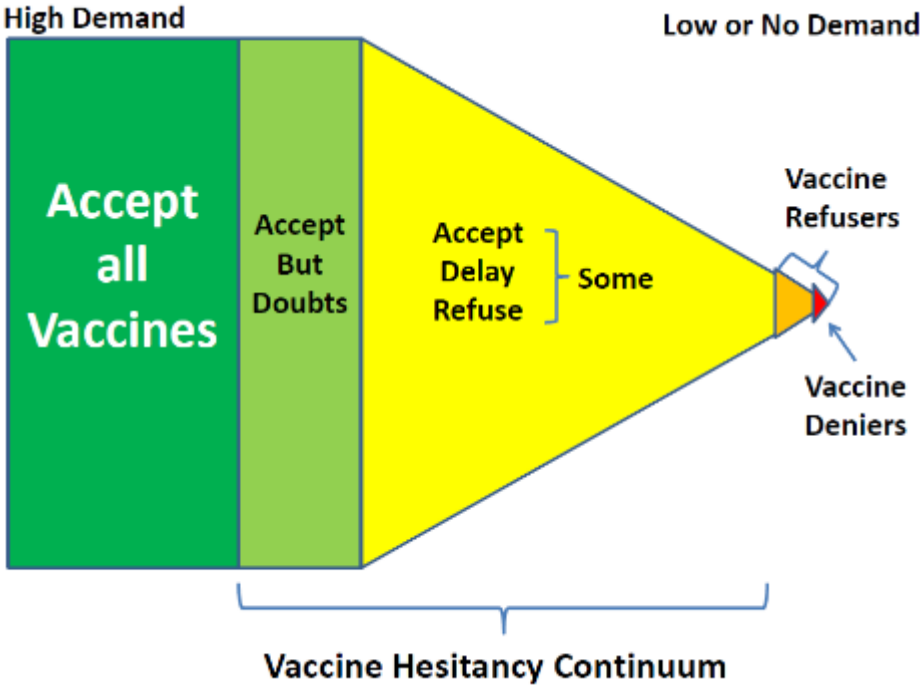
  WHO HQ, member of SAGE

- Biases

I believe vaccines are safe, effective,

serious diseases can occur if not immunized

Definition of Vaccine Hesitancy



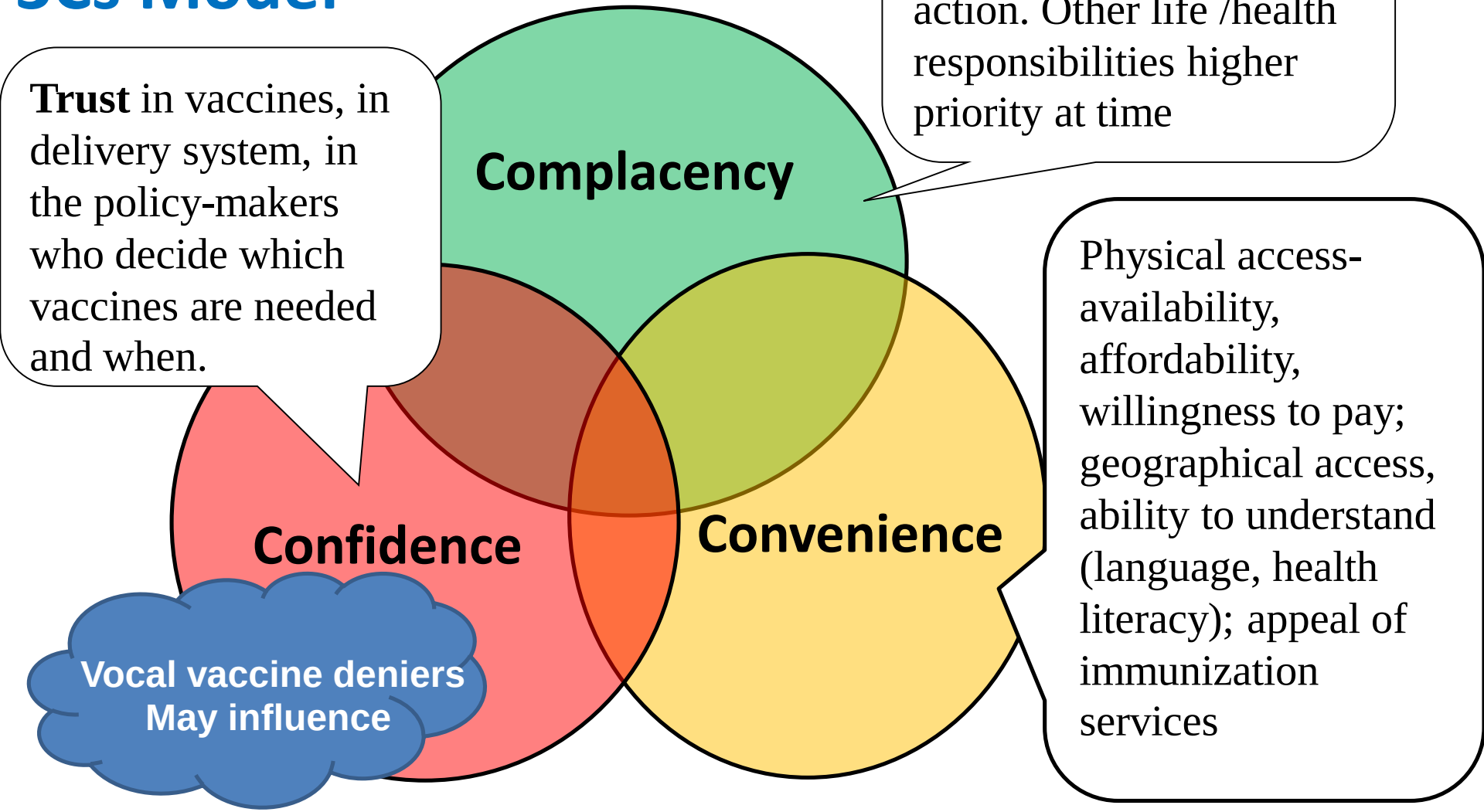
Vaccine Hesitancy

- refers to delay in acceptance or refusal of vaccines ***despite availability of vaccine services***
- ***complex*** *and* ***context specific*** *varying across* ***time, place*** *and* ***vaccine***
- *influenced by such factors as* ***complacency, convenience*** **and** ***confidence***

Problem in HIC, MIC ,LIC

SAGE Working Group on Vaccine Hesitancy Final Report
www.who.int/immunization/sage/meetings/2014/october/SAGE_working_group_revised_report_vaccine_hesitancy.pdf?ua=1
MacDonald NE and SAGE Working Group on Vaccine Safety. Vaccine 2015; 33(34):4161-4

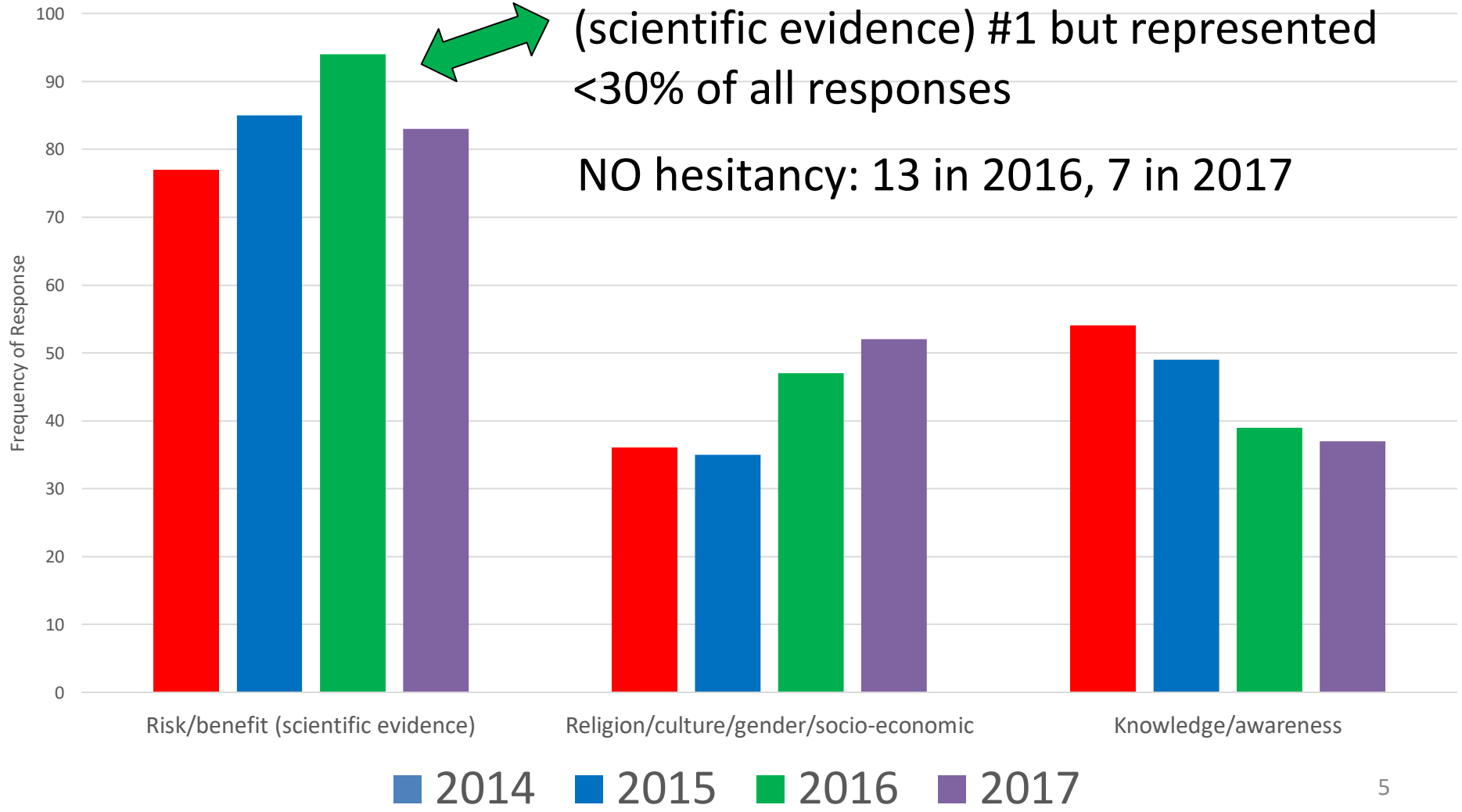
Vaccine Hesitancy Determinant Categories 3Cs Model



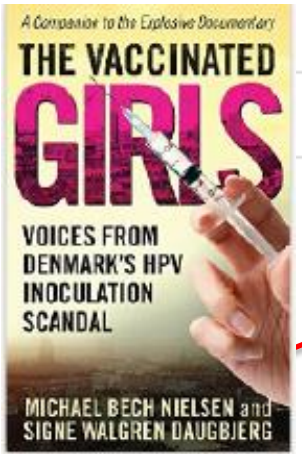
Top 3 Reasons Hesitancy Around Globe 2014- 2017 JRF

1,536 reasons over 4 yrs, risk/benefit (scientific evidence) #1 but represented <30% of all responses

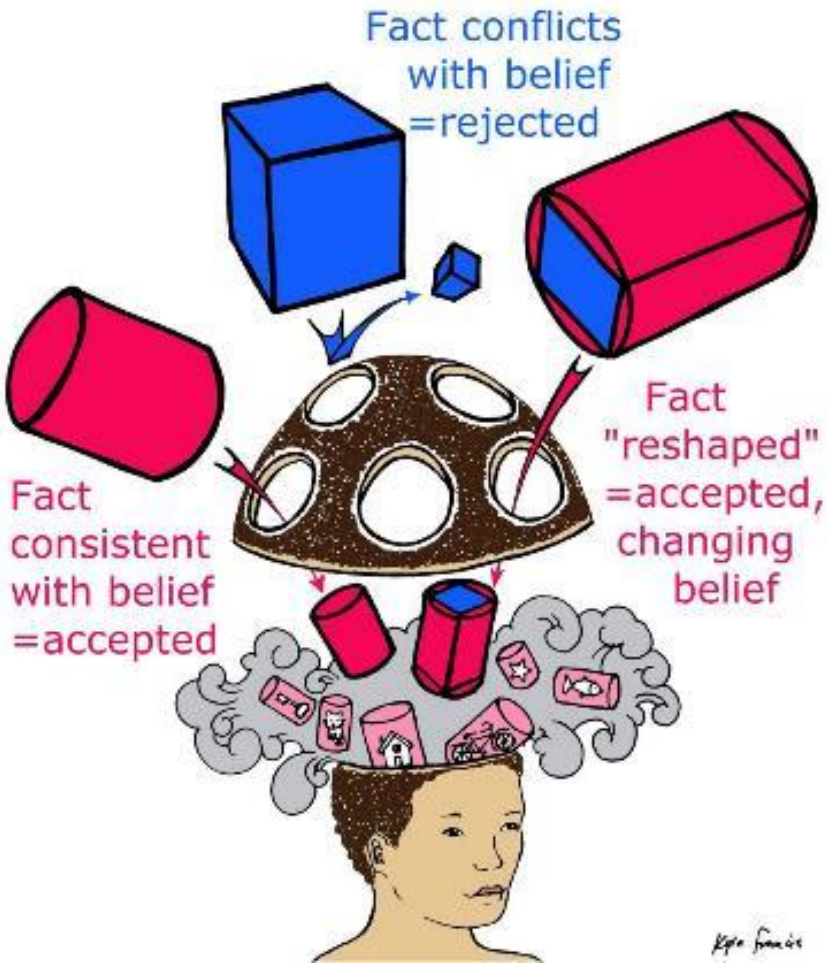
NO hesitancy: 13 in 2016, 7 in 2017



HPV Vaccine Coverage 1st Dose by Birth Cohort In Nordic Countries



Risk Perception and Vaccine Decisions



Drawn towards sources that share our world view (**assimilation bias**)

Risk perceptions are intuitive, automatic and often unconscious

Emotions play a role in how people make decisions

Emotions play a role in how people interpret numerical information

Vaccine Hesitancy

influenced by many **social, cultural, demographic** and **socio-psychological** factors

- *We are strongly influenced by what we think others around us are doing or expecting us to do (social networks)*

- *We see causation in coincidences*
- ***We see what we believe, rather than believing what we see***

- *We prefer anecdote and stories to data and evidence*
- *We pay more attention to negative information*

- *May not trust health system/gov't; trust that natural is better*

Dube E, MacDonald NE. Lancet ID 2016; 16(5):518-9; Browne M. Human Vac & Imm 2018

Social Media & Social Contagion

Post Modern Town Square

Web2.0 "everyone, anyone is an expert" now big audience for "fringe" views

Websites, Blogs, Soc Media

Misinformation is contagious

Accessing *vaccine critical* sites, *changes risk perception*

Exposure to conspiracy theories: *hidden impact on beliefs*

Over time polarization soc media selected to fit beliefs

HPV vac & Twitter US: 2 years

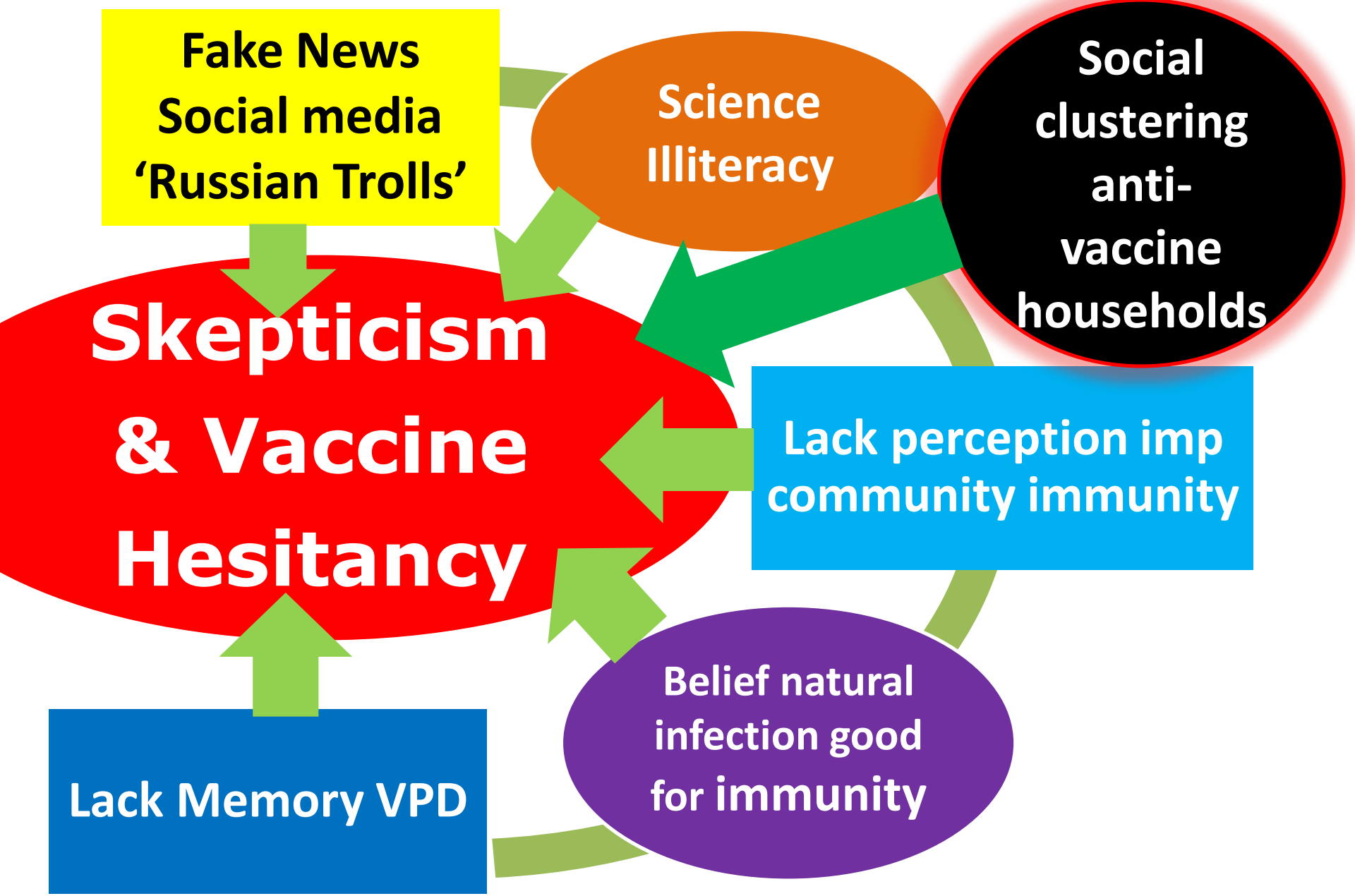
- 273.8M exposures to 258,418 tweets: much –ve
- **Twitter exposures *explained 68% variance in HPV coverage*; better than SEC**

echo chamber for beliefs

Dissent- backlash

Russian trolls – promoting discord

Dunn AG et al Vaccine 2017; 35(:3033-3040
Schmidt et al Vaccine 2018;36:3606–3612
Broniatowski et al Am J Public Health. 2018;108:1378–84.



Mantovani and Santoni Eu J Imm 2018; 48:12-14;, Brunson EK. Pediatrics. 2013; 131: e1397-04.;Opel DJ, Marcue E. Pediatrics 2013;131;e1619-20; Leask et al. Vaccine. 2006; 24(49–50):7238–7245; Miton H, Mercier H. Trends Cog Sci 2015;19: 633-6

12 Approaches to Enhance Vaccine Acceptance/Address Hesitancy

At Immunization Program Level

1. Detect and address hesitancy
2. Ensure HCW best immunization practices
3. Utilize evidence based strategies known to ↑ uptake
4. Effective Communication plan
5. Educating children, youth, adults on the importance immunization for health
6. Work collaboratively

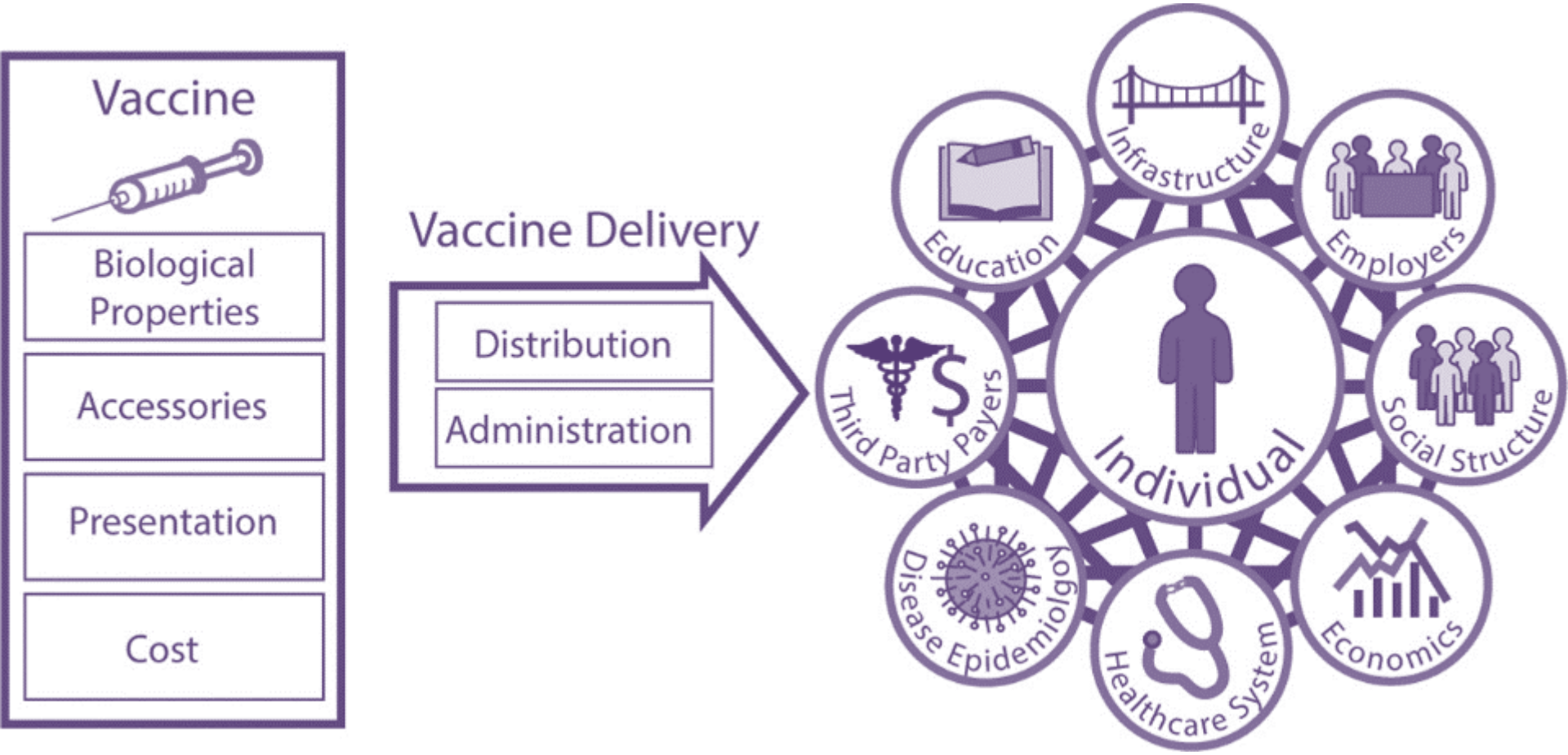
At individual Level

7. HCP – key role in imm
8. Don't dismiss from practice
9. Use effective parental discussion techniques
10. Use clear language
11. Reinforce role community immunity
12. Address pain at immunization

Foster Vaccine Acceptance Resiliency

Dube E, MacDonald NE. Lancet ID 2016; 16(5):518-519
Dube E, MacDonald NE Vaccine 2017: 35(32):3907-3909

To Increase Vaccine Uptake: Must Address Supply Side Factors Too



Lee B et al A systems approach to vaccine decision making Vaccine 2017; 35: A36–A42

1. Everyone is *not* Same: **Detect and Address Vaccine Hesitant Subgroups**

Reasons for hesitancy vary;

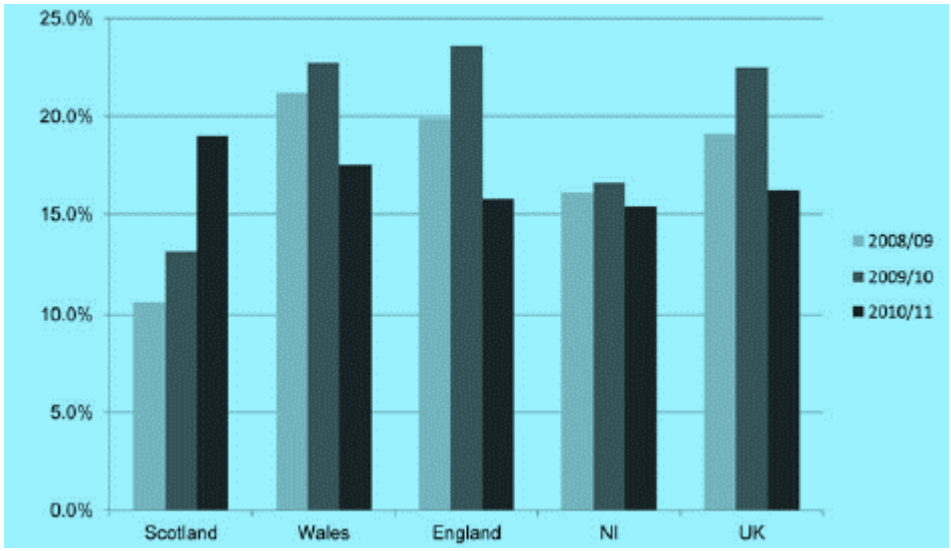
- not uniform over pop^{n};
- may change over time
- vary by vaccine, by age*
- may be clustered

At program level: **key to identify subgroups low immunization- hard if no immunization registry**

WHO EUR: The Guide to Tailoring Immunization Program- "TIP"

Butler R, MacDonald N. Vaccine 2015;33:4176-9
Dube et al Vaccine 2018;36: 1509-15
Thomas (Aust) et al Vaccine 2018; 36:2596-2603

Failure of HPV 3 Dose Uptake in UK



2010–2011 HPV vaccine coverage in Birmingham, England (%)

Strategic Health Authority range	Dose 1	Doses 1&2	All 3 doses
South Birmingham PCT	92.8	92.1	88.9
Birmingham East and North PCT	80.8	80.1	77.9
Heart of Birmingham PCT	75.1	74.2	71.3

Boyce T, Holmes A PLoS ONE 2012; 7: e43416
**St Sauver et al Preventive Medicine 2016; 89:327–333*

2. HCW Impact Vaccine Acceptance: Ensure HCW use Best Immunization Practices

HCW's own immunization status: -reflects onto their patients' status

HCW vaccine beliefs & knowledge: - influences whether families will accept immunization or even be offered in +ve manner

HCW in Zambia – HPV vax perceptions vary

Fam doc in France – vax perceptions vary (& vary by locale)

For optimal outcome patients need to hear ***from all HCW*** :

- consistent, accurate information: vaccine preventable disease risks, vaccine safety & benefits
- given in a respectful, positive manner

Educating HCP

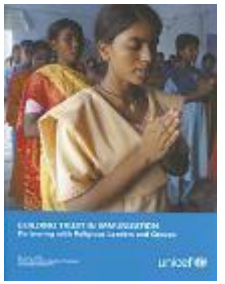
- re HPV vax ↑ HPV uptake: study US military
- re mini MI ed Peds res -works to increase vaccine uptake
- Fam Med CME on information-motivation and behaviour: ↑ flu vax uptake by patients

3. Multiple dimensions to hesitancy:
Use Effective Strategies known to ↑ Vaccine Uptake

a) directly **target** population/subgroup of interest

b) not just about **increasing knowledge, awareness** about vaccination*

c) **engage community leaders, religious** or other **influential leaders** to promote vaccination in the community.



d) **improve convenience and access** to vaccination;

e) employ **reminders** and follow-up;

f) **mandate** vaccinations / sanctions for non-vaccination,

$$ incentives;

g) **Multi pronged** better than single strategy intervention

Jarrett C, et al.Vaccine 2015; 33:4180-90; Dube E et; Vaccine. 2015 14;33:4191-203;
*Das et al Journal of Adolescent Health 2016; 59:S40eS48 Ofstead et al Vaccine 2017;*35:2390-2395
Rand et al Pediatrics 2018; 41(4):e20170498

Religion and Vaccines

Review of major religions of world –

-most religious doctrines support

- **caring for others**,
- **preserving life**
- **having a duty to the community** (family, neighbours, each other) ***i.e. support vaccination***

Grabenstein JD. Vaccine 2013;31:2011-23

- **exception Christian Scientists; Dutch Reform Church**

  https://www.health4thinkers.com/4663/christian-scientists-and-public-health/

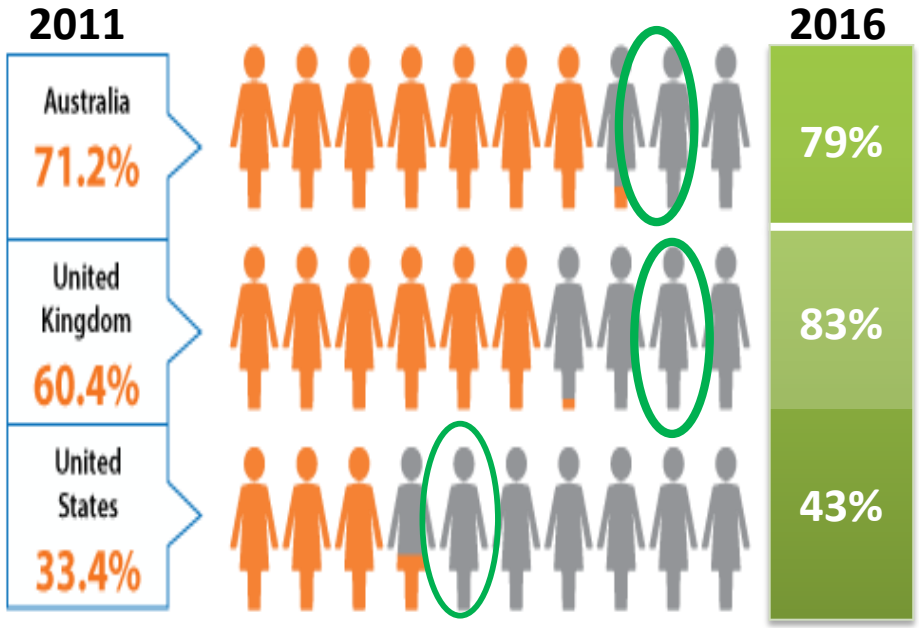
- did not look at anthroposophical **-**

  Bystrom et al Vaccine 2014;32: 6752-7 ; http://www.anthromed.org/Article.aspx?artpk=764

  "Vaccination will not be harmful if, subsequent to vaccination, a person receives a spiritual education."

Ease of Access to Imm Matters

HPV full dose Coverage among Girls in HIC 2011 & 2016



Other options to ease access

- "bundling" of vaccines
- offering vaccines every visit health care system
- standing orders
- access different sites – pharm, clinics, MD office

- UK 2014/15 Flu vax uptake: schools 55% > pharmacies 27% > GP 24%
- US: 2016 Flu vac uptake schools > 54%> MD office47% *P < .001*
- US survey parents re HPV pharm – more convenient than MD (59%); ease access more imp than healthcare environment

Immunization Programs: Efforts to Increase Acceptance: Hearts, Minds, Nudges & Shoves

Tailored programs: often focus on

addressing

confidence,

complacency,

convenience

hesitancy concerns

emphasize social norms

build trust*

in vaccines,

in program

in HCP

Problem

– hearts and minds campaign

may not work

or only work for some groups

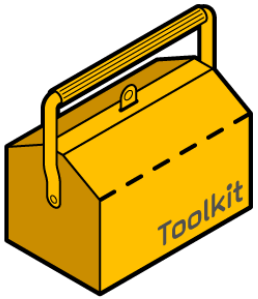
May need

nudges (reminders)

shoves & smacks

-mandatory requirement:

incentives & penalties



**WHO EURO http://www.euro.who.int/en/health-topics/disease-prevention/vaccines-and-immunization/publications/2017/vaccination-and-trust-2017*

Attwell & Smith Vaccine 2018;36:6506-08

Reminders/Prompts Make a Difference

Effective in 0-5 yr & in adolescents

- postal, telephone, text reminders help

Work in HIC, MIC, LIC

Herret E et al BMJ Open 2016;6:e010069.
Harvey H,et al . Vaccine2015; 33(25): 2862-2880.
Domek et al Vaccine 2016; 34: 2437-2443
Das JK et al J Adol Health 2016; 59:S40eS48
Tomson et al Vaccine 2016; 34: 1018–1024

Seniors:

Pneumococcal vax & flu vax

Beware older person living alone- less likely immunized UTD

Cameron KA et al J Gen Int Med 2016; 31 Suppl 2 S174
Sutcliffe K et al Vaccine 2017;35: 1148-1151
Jain A et al Vaccine 2017; 35: 2315-28

Adolescent

US office based urban study **HPV**

Text > phone if already started

Phone effective only for enroll dose 1

Rand et al J Adol Health 2017; 60: 113e119

But US (SC, OK)– parental permission study to direct text message teens from MD office

allow: 75% F vs 60% M

- med age ≥14 y F; ≥ 15y M

Roberts et al Vaccine online Apr 10 2018

Pregnancy

Sys review – among strategies that work but HIC studies

Bisset, Paterson. Vaccine online Apr 14 2018 Vaccine online Apr 10 2018

Mandatory Immunization & Incentives

Complex area- not the simple solution

Mandatory

- soft to hard
- variation application:
  - -day care, school entry/ attendance
  - -single vax, sev vax , all vax
- Variation in foundation
  - laws
  - penalties
  - enforcement
  - AEFI compensation programs

Ethical issues: individual vs community risk/benefit

+/-unintended consequences

e.g. Australia -no jab not pay- variable exclusion from services

- sl ↑uptake (0.94%),
- ↓ daycare access esp low income

- save gov't >$500 M

- *most effect on low income where problem lower uptake NOT hesitancy but access barriers*

Outcome: *"generally work"* only HIC data- mostly US

Beware: may backfire – UK history; Poland 2018 marches in street

MacDonald et al Mandatory Infant & Childhood Immunization: Rationales, Issues and Knowledge Gaps . Vaccine 2018; 36(39):5811-5818

4. Effective Communication

- Knowledge ≠ Action
- **Knowledge is important but not always = change behaviour**
- Be proactive NOT just reactive: *but pay attention to media reports*
- Communication: two-way process: **listening is key -↑ trust**
- Choose **knowledge to focus on** carefully: target audience- tailor plan to fit: adults vs adolescent vs infant child vax
- Ensure **HCP** communication **not just community**
- Many communication tools available: **ensure fit for purpose**
- **Evaluate impact and adjust**: focus on health literacy, understand emotions, exploit medical evidence
- **Information needs to changes over time**

Mantra needs to be: communicate, communicate, and more….. be sure fit audience targeting

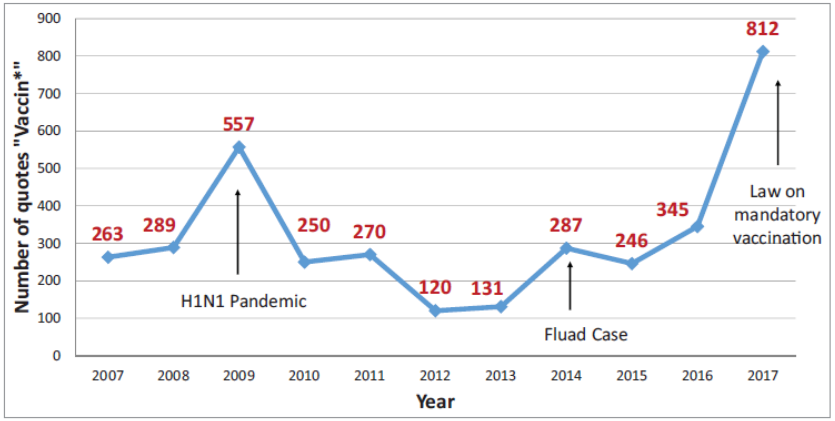
Also need crisis communication plan- WHO EURO template

http://www.euro.who.int/__data/assets/pdf_file/0014/333140/VSS-crisis-comms-plan.pdf?ua=1

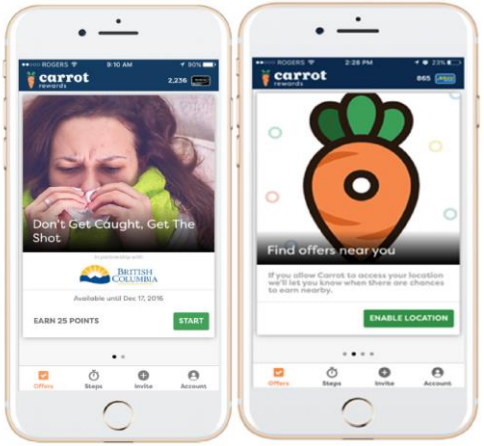
Monitoring and Using Media

- Helpful to track –note trends
- Many different options
- tailor to fit
- no one size fits all- who is your target?
- ***UK: Vaccine Today-*** targets fence sitters
- Website and social media channels
- ***US: Imm Action Coalition***

Italy –vaccine print stories 2007-2017



Be creative & evaluate



- Smart phone app- uses reward points as incentive for flu imm

Odone et al Hum Vaccin Immunother 2018
Dale et al Vaccine 2018 online Apr

Inoculating Against Misinformation: Extrapolating from Climate Change

Highlighting consensus among medical scientists increases public support for vaccines:

"Gateway Belief Model" *Van der Linden et al. BMC Public Health 201515:1207*

What if false information presented? e.g. false meme- goes viral

Climate Change: Can confer attitudinal resistance: pre-emptively highlight false claims, refute pot^{n} counterarguments + unmask techniques* being used *Van der Linden, S et al Climatic Change 2014 126; 255-262.* *Van der Linden, S et Science 2017 ;358(6367):1141-1142*

What about vaccine misinformation ?

No similar studies

WHO EURO: How to respond to vocal vaccine deniers in public

Step by Step: develop plan

http://www.euro.who.int/__data/assets/pdf_file/0005/315761/Best-practice-guidance-respond-vocal-vaccine-deniers-public.pdf?ua=1

*Techniques used by VVD: conspiracy, selectivity, 100% safe, fake experts, misrepresentation/false logic

5. Shape Children and Youth Vaccine Beliefs

Start early:

- Primary: what vaccines are, why needed, benefits, safety
- Secondary: weave into history, science and health
- Engage expert teachers and students - many resources
- Denmark- CPN – developing curriculum
- Canada -Ontario has included child and youth vac edu in 2020 Imm plan
- ***Kids Boost Immunity***

https://kidsboostimmunity.com/

6. Work Collaboratively Partnership: Key Asset

National immunization program

Public health

Academia

HCP societies

Manufacturers *

Civil Society Organizations;

Global agencies

Private Sector

NGOs etc

Saves time, resources, adds voices, Enhances credibility HCW vaccine message

7.Key Role HCP *in Vaccine Acceptance*

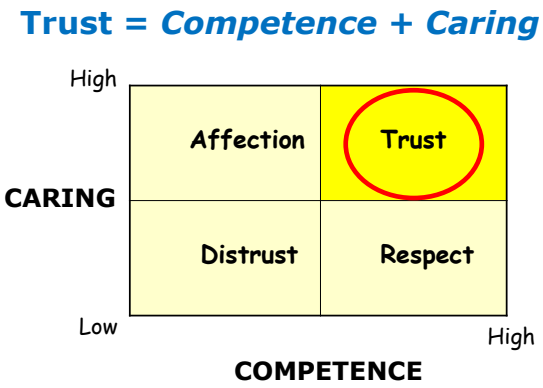
Strength of HCW recommendation very influential in the decision to accept *vaccines…TRUSTED*

Imp hear from HCP vs friends/family

Italian *survey- parents children 16-36 months*

Pediatricians reliable source of information

for most pro-vaccine and hesitant parents



Main factors associated with hesitancy:

- ***not*** having received recommendation for vax from paediatrician (AOR): 3.21, 95% CI: 2.14–4.79],
- ***received discordant opinions*** on vaccinations (AOR: 1.64, 95% CI: 1.11–2.43),
- met parents of children who experienced serious adverse reactions (AOR: 1.49, 95% CI: 1.03–2.15),
- using non-traditional medical treatments (AOR: 2.05, 95% CI: 1.31–3.19).

Giambi al Vaccine 2018 36(6):779-787

8.Vaccine Refusers and Hesitant

Refusers:

- Do Not dismiss
- Try to build trust
- ***Not a debate***
- ***Do NOT make session a vax information dump***
- Try to determine concerns with " *what would it take to move you to a yes to accept vaccines?"*
- **Inform - Responsibilities for refusers**
- Consider referral

Hesitant:

- Determine basis of hesitancy – do not assume
- Do not over estimate parental concerns
- **Listen and listen**
- **Tailor response to concerns**

http://www.euro.who.int/en/health-topics/disease-prevention/vaccines-and-immunization/publications/2012/if-you-choose-not-to-vaccinate-your-child,-understand-the-risks-and-responsibilities

www.caringforkids.cps.ca/handouts/when-parents-choose-not-to-vaccinate-risks-and-responsibilities

MacDonald et al Paediatrics & Child Health 2018

https://academic.oup.com/pch/advance-article/doi/10.1093/pch/pxy116/5112977?guestAccessKey=6823840f-170e-4fad-9268-5d3521a35691

9 a. Use Effective Parental Discussion Techniques

Much focus of "evidence based medicine" is on ***content***- GRADE, RCTS

BUT: evidence of good content not same as evidence of good process and vice versa.

http://howmed.net/community-medicine/randomized-controlled-trials/

Well-conceived messages, delivered poorly, may not have as much impact as poorly constructed messages delivered well.

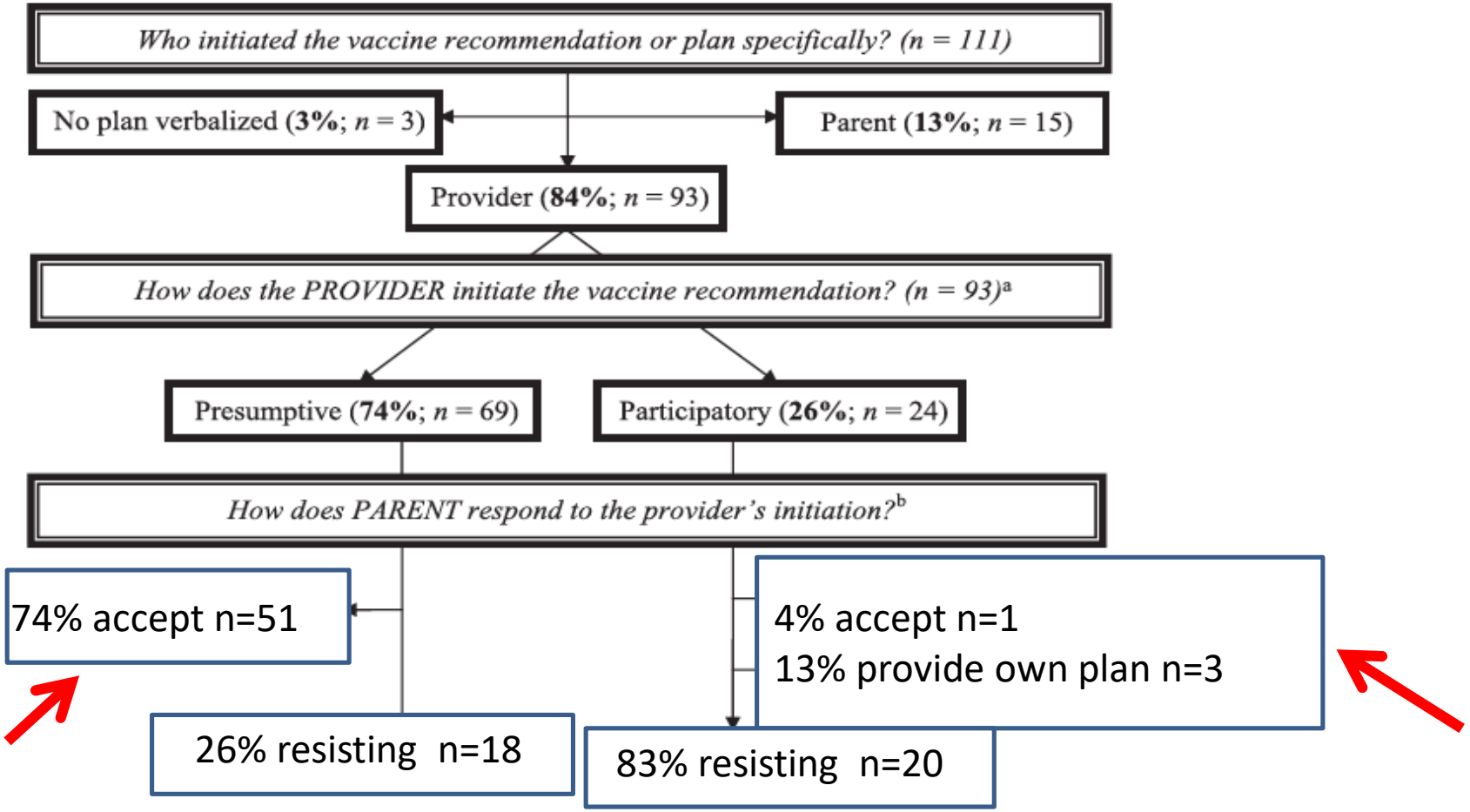
High acceptance rates not mean no concerns

Australia – bkg rate vaccine acceptance >90% routine imm vaccine study parents children <5y; 98% valued vaccines acceptance 43% had concerns – need to address specific concerns ……..

Parrish-Sprowl. Vaccine 2017 online Oct 4
Costa-Pinto et al J Paed Child Health 2018; 54:522-529

9b. Use Effective Parental Discussion Techniques

a)Presumptive: Tell don't ask:



Presumptive (default) - So Juan needs his MMR and meningococal vaccines today, …….then check if any concerns

Opel et al Pediatrics 2013; 132: 1037-46 (infant vaccines)
Brewer et al Pediatrics 2017;139:e20161764 (HPV)

9c.Use Effective Parental Discussion Techniques

Address Concerns :
"Micro" or "Mini"
Motivational Interviewing

- client centred, semi-directive, aimed at changing behaviour
- shift from

TALKING TO →
WORKING WITH

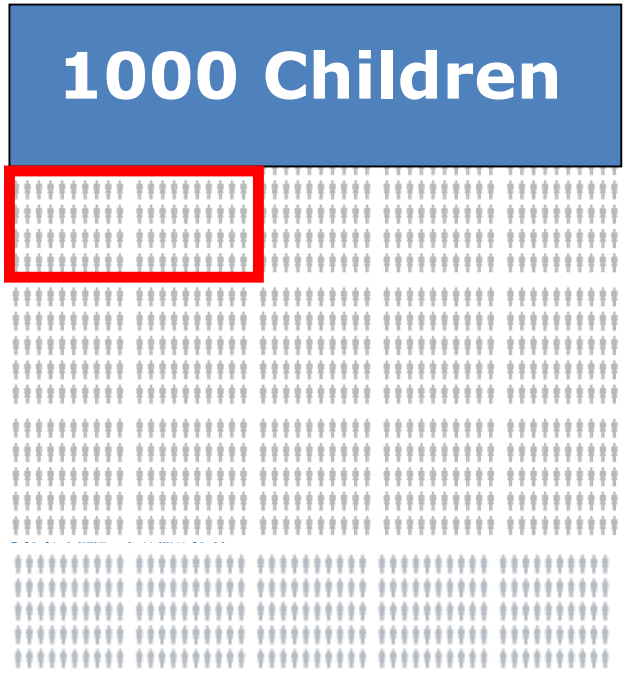
" What would it take to move you to a yes to accept vaccines?"

Tailor discussion to fit concerns: develop trust

Open ended questions	• What do you think about vaccines?
Listen reflectively	• You are concerned by
Affirm Validate	• I understand
Ask Provide Verify	• What know, provide vaccine info, verify understand
Summarize	• Let me summarize

WHO guide patient interaction and training tools
http://www.who.int/immunization/programmes_systems/vaccine_hesitancy/en/
Gagneur et al Vaccine 2018;36: 6553-6555

10. Use Effective Clear Language



Tetanus 10% die even with ICU care = 100 in 1000

1. Standard vocabulary
2. Consistent denominator
3. Present risks/benefits fairly: tell truth
4. Explain single event probability (rain,not rain) visual aides
5. Absolute numbers not relative risk or %
6. Frame your message *
7. Avoid using jargon **

Frame Vaccine Message

Individuals

Anxious about negatives *(negativity bias)* **:**

HPV vaccine : > 99.9% safe- **better /more effective** than <<0.1 % serious side effects

College HPV study:

STI framing: if told HPV most common STI, can catch from others = HPV seen as shameful ……↑uptake HPV vaccine

Communities/General Public

pandemic H1N1:

Sweden +ve frame: 60%

Australia-ve frame : 18%

11. Present Concept: Community Protection Not use Jargon: Herd Immunity

- Reinforcing added value community immunity helpful
  NB US in 2015 – first measles death in 12 years in immunocompromised patient
- **BUT: not at expense of noting personal benefit**
  not help all VPD e.g. tetanus
- Jargon: can be a problem
  " **herd** Immunity" equated with
- "**herd mentality**" - means unnecessary but unproven, illogical, unrealistic, and unreliable – a bad thing
- **Community protection** better understood term

12. Address Pain at IMM

2015 Canadian Pain Guidelines (GRADE):

Covers age range: neonates to adults 3 Ps

physical, psychological, pharmacological

e.g.

- *Breast feeding during imm ↓ pain infants*
- *Give most painful vax last ** need help – manufacturers*
- *Rota virus vax – first because sucrose ↓ pain infants*

CARD: School based programs

Comfort, Ask, Relax, Distraction

WHO : Report to SAGE on Reducing pain and distress at the time of vaccination. (reviewed using AGREE)

Maternal experiences 1st year with infant immunization

↓pain ++imp + information

→ affects long term immunization attitudes

Adolescents: decrease AEs- exercise arms. Legs

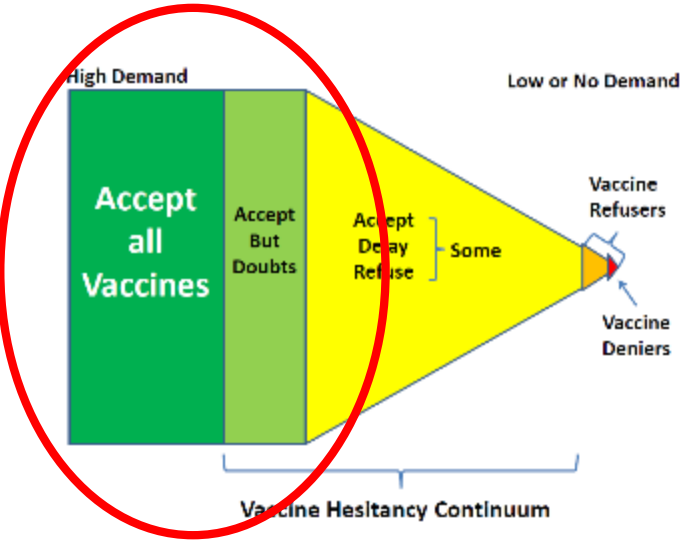
www.who.int/immunization/sage/meetings/2015/april/1_SAGE_latest_pain_guidelines_March_24_Final.pdf

WHO HCW Training module: WHO guide patient interaction and training tools

http://www.who.int/immunization/programmes_systems/vaccine_hesitancy/en

As Address Hesitancy:

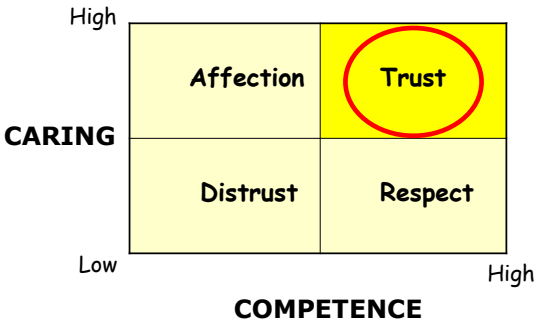
Do Not to Neglect Vaccine Accepting Group



- Value their decisions: + ve reinforcement
- Nurture trust: caring + competency
- Exploit social networks and contagion: parents, teens, preg women- Set social norm for nudge
- Grow resiliency against anti-vaccine: a)whole community communication re vax: sci, HCP, academics, NGOs etc

  b) Develop effective communication strategies- listen & tailor messages; inoculate against misinformation, anti-sci techniques

Trust = *Competence + Caring*



Ozawa et al BMC Health Serv Res 2016;16 (Suppl 7): 639; Dube E, MacDonald NE Vaccine 2017: 35(32):3907-3909; *WHO Regional Office for Europe. Vaccination and Trust. 2017*
http://www.euro.who.int/__data/assets/pdf_file/0004/329647/Vaccines-and-trust.PDF

Goal Building Resilient Pro-Vaccine Communities Globally

Acceptance

Hesitant

Brickset.com

Websites

WHO HCW Training module: WHO guide patient interaction and training tools
http://www.who.int/immunization/programmes_systems/vaccine_hesitancy/en

http://www.who.int/immunization/sage/meetings/2014/october/SAGE_working_group_revised_report_vaccine_hesitancy.pdf?ua=1

WHO: www.who.int/immunization/en/
www.vaccine-safety-training.org
List websites meet WHO quality criteria

www.who.int/immunization_safety/safety_quality/vaccine_safety_websites/en/index.html
www.unicef.org/ceecis/resources_1462.html

Vaccine Communication Resources

http://www.paho.org/immunization/toolkit/technical-resources.html

https://www.paho.org/hq/index.php?option=com_content&view=article&id=3130&Itemid=3504&lang=en

www.cdc.gov/vaccinesafety

www.immunizationinfo.org (Nnii)

www.immunize.org (IAC)

www.dovaccinescausethat.com

www.vaccinateyourbaby.org

www.voicesforvaccines.org

www.caringforkids.cps.ca/handouts/immunization_information_on_the_internet

www.vaccineinformation.org/

www.euro.who.int/en/what-we-do/health-topics/disease-prevention/vaccines-and-immunization/immunization-resource-centre

www.bccdc.ca/NR/rdonlyres/DADA3304-7590-48AC-8D2C-65D54ADFC77E/0/CDC_IC_Tool.pdf