Impact of Vaccine Hesitancy and Strategies to Increase Immunization Uptake

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

Oct 18, 2018
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

**Trust** in vaccines, in delivery system, in the policy-makers who decide which vaccines are needed and when.

Perceived risks VPD low; vaccination not deemed a necessary preventive action. Other life /health responsibilities higher priority at time

Physical access-availability, affordability, willingness to pay; geographical access, ability to understand (language, health literacy); appeal of immunization services

Vocal vaccine deniers May influence
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

- Denmark
- Sweden
- Norway
- Finland
- Iceland
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.

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

---

Russian trolls – promoting discord

Dunn AG et al Vaccine 2017; 35(:3033-3040
Schmidt et al Vaccine 2018;36:3606–3612
Skepticism & Vaccine Hesitancy

- Fake News
- Social media
- ‘Russian Trolls’

Science Illiteracy

Social clustering anti-vaccine households

Lack perception impact community immunity

Belief natural infection good for immunity

Lack Memory VPD

# 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

---

*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;
- 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

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

---

*References:

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) \textit{i.e. support vaccination}
- exception Christian Scientists; Dutch Reform Church
- did not look at anthroposophical -
  \textit{“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**

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>71.2%</td>
<td>79%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>60.4%</td>
<td>83%</td>
</tr>
<tr>
<td>United States</td>
<td>33.4%</td>
<td>43%</td>
</tr>
</tbody>
</table>

**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 office 47%  \( P < .001 \)
- 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

Problem
– hearts and minds campaign may not work or only work for some groups

May need
nudges (reminders)
shoves & smacks

-mandatory requirement:
incentives & penalties

Tailored programs: often focus on
addressing
confidence,
complacency,
convenience
hesitancy concerns
emphasize social norms
build trust*
in vaccines,
in program
in HCP

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

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

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

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 2015;15:1207

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 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

*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

www.caringforkids.cps.ca/handouts/when-parents-choose-not-to-vaccinate-risks-and-responsibilities
MacDonald et al Paediatrics & Child Health 2018
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. *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:

Who initiated the vaccine recommendation or plan specifically? (n = 111)

- No plan verbalized (3%; n = 3)
- Parent (13%; n = 15)
- Provider (84%; n = 93)

How does the PROVIDER initiate the vaccine recommendation? (n = 93)\(^a\)

- Presumptive (74%; n = 69)
- Participatory (26%; n = 24)

How does PARENT respond to the provider’s initiation?\(^b\)

- 74% accept n=51
- 26% resisting n=18
- 83% resisting n=20
- 4% accept n=1
  13% provide own plan n=3

Presumptive (default) - So Juan needs his MMR and meningococcal 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
  - I understand
- Validate
- Ask
  - What know, provide vaccine info, verify understand
- Provide
- 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

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.unicef.org/ceecis/resources_1462.html
Vaccine Communication Resources

http://www.paho.org/immunization/toolkit/technical-resources.html
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.bccdc.ca/NR/rdonlyres/DADA3304-7590-48AC-8D2C-65D54ADFC77E/0/CDC_IC_Tool.pdf