



A Century of Immunity: The Evolution of Vaccines



100 Years of Outsmarting the Invisible The Good, the Bad & the Ugly

Scott Hamstra

MD, FAAP, CAPT(ret) USPHS (Indian Health Service)

Lisa Tonrey

MHA, PhC, RPh, FAPhA, CAPT(ret) USPHS (Indian Health Service)

Financial Disclosures

- Dr. Scott Hamstra and Lisa Tonrey, faculty for this CE activity, have no relevant financial relationship(s) with ineligible companies to disclose.
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Learning Objectives

- 1. List 5 key moments in Vaccine history**
- 2. List 3 Vaccine triumphs & 3 missteps in the past century**
- 3. List 3 Vaccine strategies for Arizona by 2030**

100-year Timeline- Highlights

FLU
Pandemic
1918-19

Picture
yourself

1900

1920

1940

1960

1980

1990

2000

2010

2020

2030

The pre -vaccine landscape:

High infant mortality
& "The Big Three"

- Smallpox
- Diphtheria
- Polio

*What could you do as a
parent?*

or professional?

(nurse, doctor, public health)



No Vaccines

No Antibiotics

No Antivirals

Did you know that in 2026 **TODAY** . . .

Better (& more) ways to protect children, teens & adults!

Every Day = Tremendous Challenge & Opportunity

Recommended Shots [AAP, AAFP, APhA, ACOG, AMA, etc]

Children & Teens => **100,000**

Adults => **80,000**

Every Day Progress protecting children, teens & adults!

Daily Vaccine Success creates **immediate VALUE**

VALUE builds over **TIME** **“compound interest”**

100-year Timeline– Vaccine Highlights

1925 – 1954

1955 – 1985

1986 – Present

1920

1940

1960

1980

1990

2000

2010

2020

2030



Diphtheria



Polio



Measles



PCV



HPV

"Bacterial" Era

Diphtheria

Tetanus

Pertussis

The "Viral" Era

Polio

Measles

Mumps

Rubella

The "Biotech" Era

Conjugate vaccines, Recombinant
technology, mRNA

Hepatitis B

Hib

PCV

HPV

Shingles

Covid (Flu mRNA)

100-year Timeline– Diphtheria

1914
Pertussis

1938
Tetanus

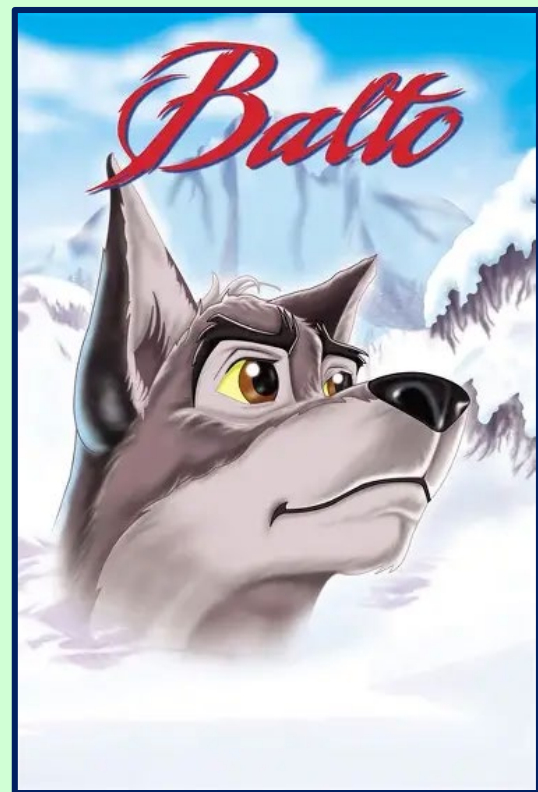
1948
DTP

1926
Diphtheria Toxoid
Formaldehyde inactivated toxin

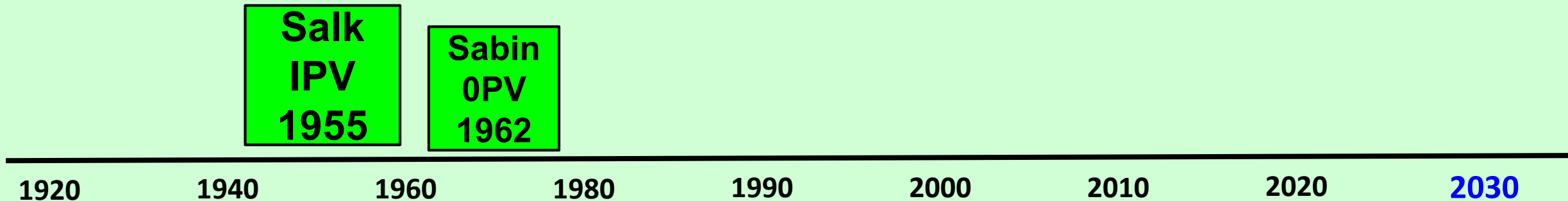
1920 1940 1960 1980 1990 2000 2010 2020 2030

1925
Alaska Sled
Dogs story

Diphtheria
Antitoxin
Treatment
Not a vaccine



100-year Timeline– Polio



POLIO Every Summer

1937
National
Foundation for
Infantile Paralysis

1938
March
of
Dimes



1949
42,173
Sick
2,720
Deaths

100-year Timeline– Polio



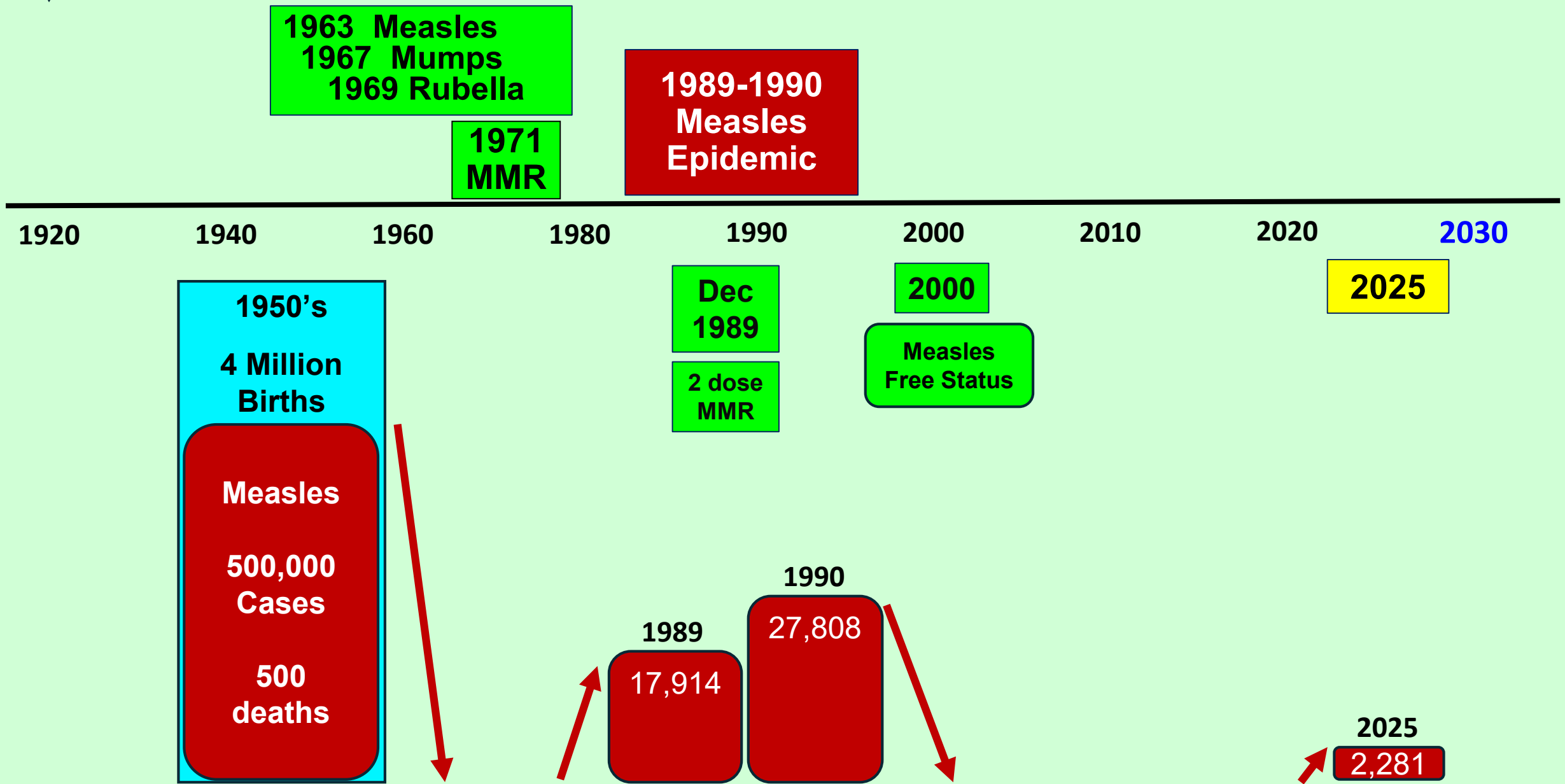
When Franklin Roosevelt started a foundation to fight polio, Comedian Eddie Cantor came up with the "March of Dimes", asking people to mail a dime to the White House. They were soon overwhelmed with 2,680,000 dimes mailed to them, literally truckloads, mostly from children. These dimes went directly to research that resulted in the Polio vaccine. This is why Roosevelt is on the U.S. dime.

Polio Paul

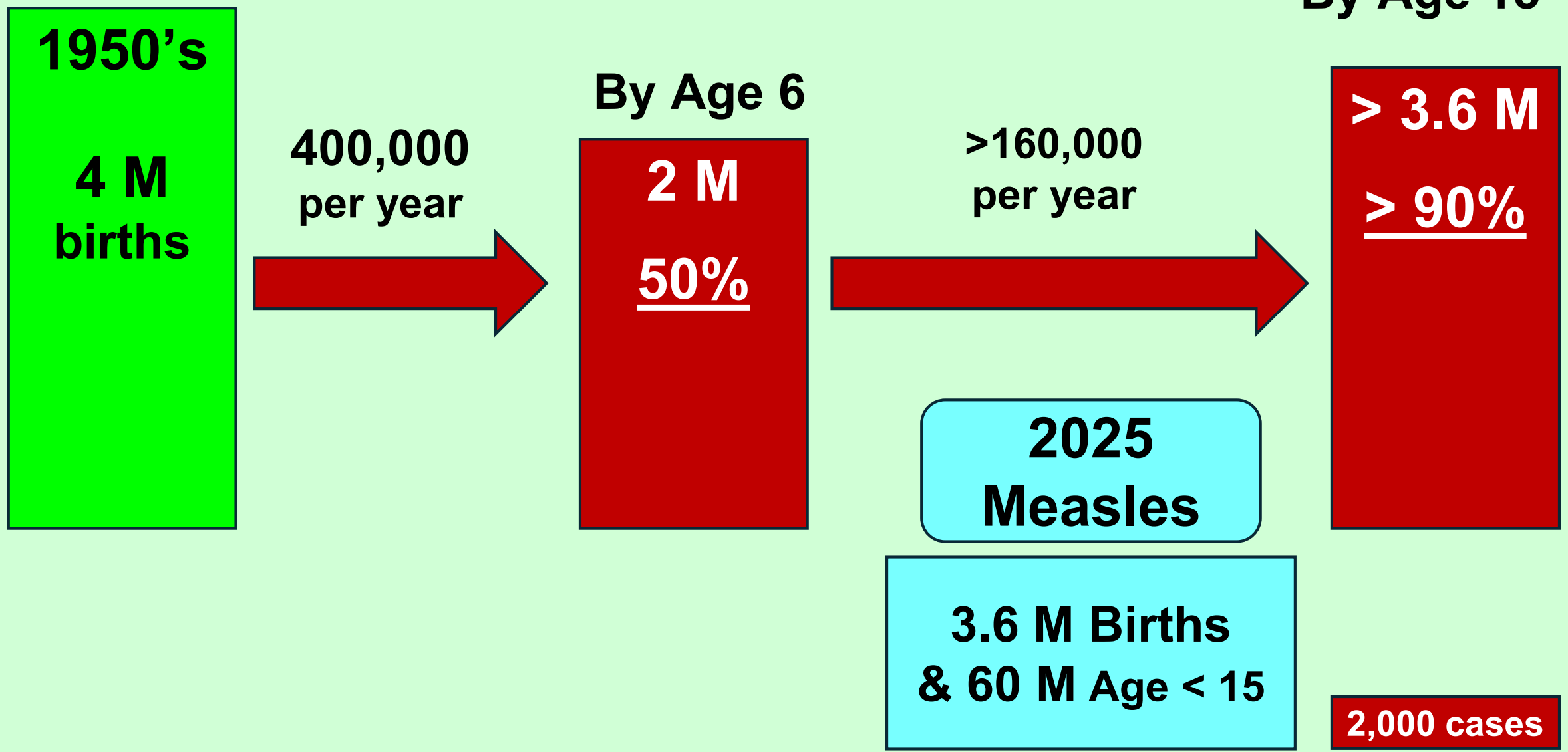
Iron lung at age 6 & used for 72 years
only recently died, March 2024



100-year Timeline – Measles



100-year Timeline— Measles



100-year Timeline– Pneumococcus

Pneumococcal
1990 story

PCV

1920

1940

1960

1980

1990

2000

2010

2020

2030





100-year Timeline—Pneumococcus

**Pneumococcus
82 serotypes**

**Pneumococcal
Conjugate
vaccines**

1980

1990

2000

2010

2020

2030

**PPSV
23**

**PCV
7**

**PCV
13**

**PCV
20**

**PCV
20/21**

**Pneumovax
Elder 65+
& High Risk**

**Infants
(3 dose
series)
Toddler
(booster)**

**Oct
2021**

**65+
High
Risk**

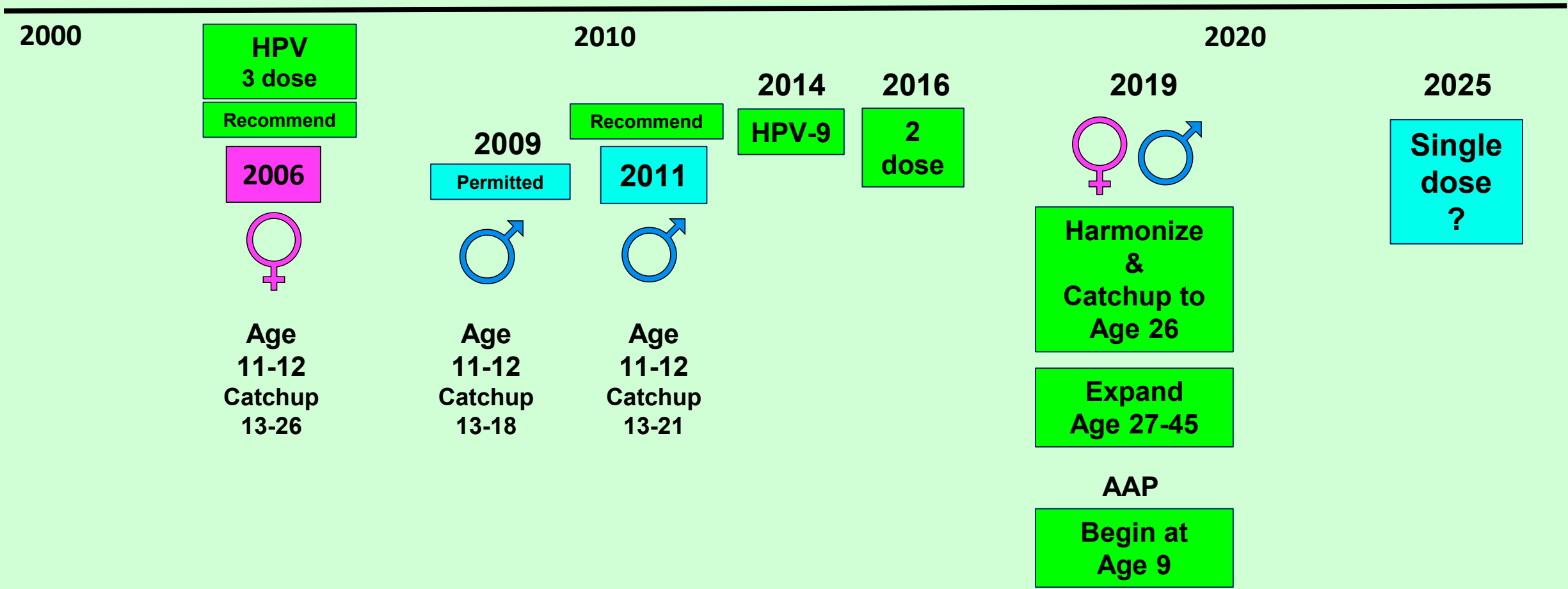
**June
2023**

**Oct
2024**

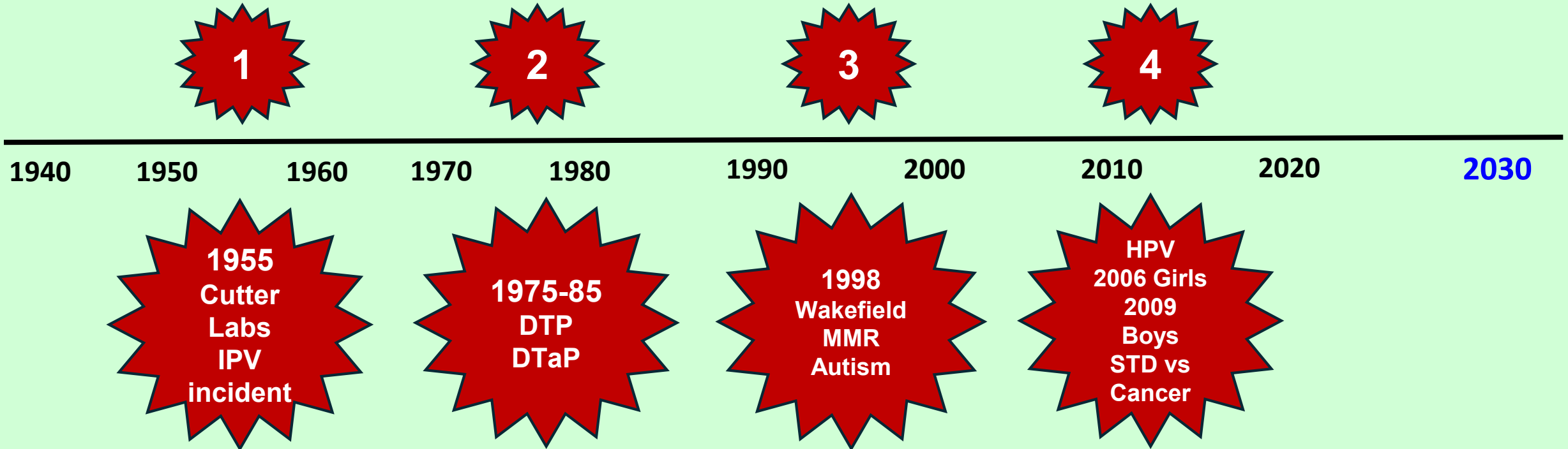
**50+
High Risk**

100-year Timeline– HPV

VACCINE PREVENTS CANCER



100-year Timeline– Missteps



Talk Radio

Cable TV

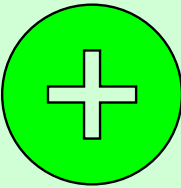
Social Media

Anti Government & Anti Science & Anti Establishment

100-year Timeline– Polio Misstep

POLIO
Salk IPV

Spring
1955



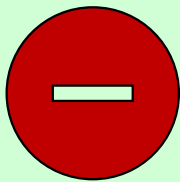
Shifted CDC standard from trust to active surveillance and transparency

1920 1940 1960 1980 1990 2000 2010 2020 2030

1955
Cutter
Labs
IPV
incident

200,000
children
Western &
Midwestern
states

40,000 sick
200 paralyzed
10 died



1958 court ruling:
no negligence

Still liable for harm

opened the
“floodgates of litigation”

100-year Timeline– DTP/DTaP Misstep

1914
Pertussis

1938
Tetanus

1926
Diphtheria Toxoid
Inactivated toxin Formaldehyde

1948
DTP

over 25 years

DTP
DTaP

NCES 1976-79
Neuro Dx 2-36 m
1981
"DPT Safe"

too little
too late

1920 1940 1950 1960 1970 1980 1990

**DTP
DTwP**
Pertussis
1914 => 1940 => 1970

Estimated
**3,000
antigens**

1974 British
DTP Study
Neurologic Side Effects

10
years

1991 DTaP
booster dose
approved

1975
Japan
Delay till
Age 2

1981
Japan
DTaP

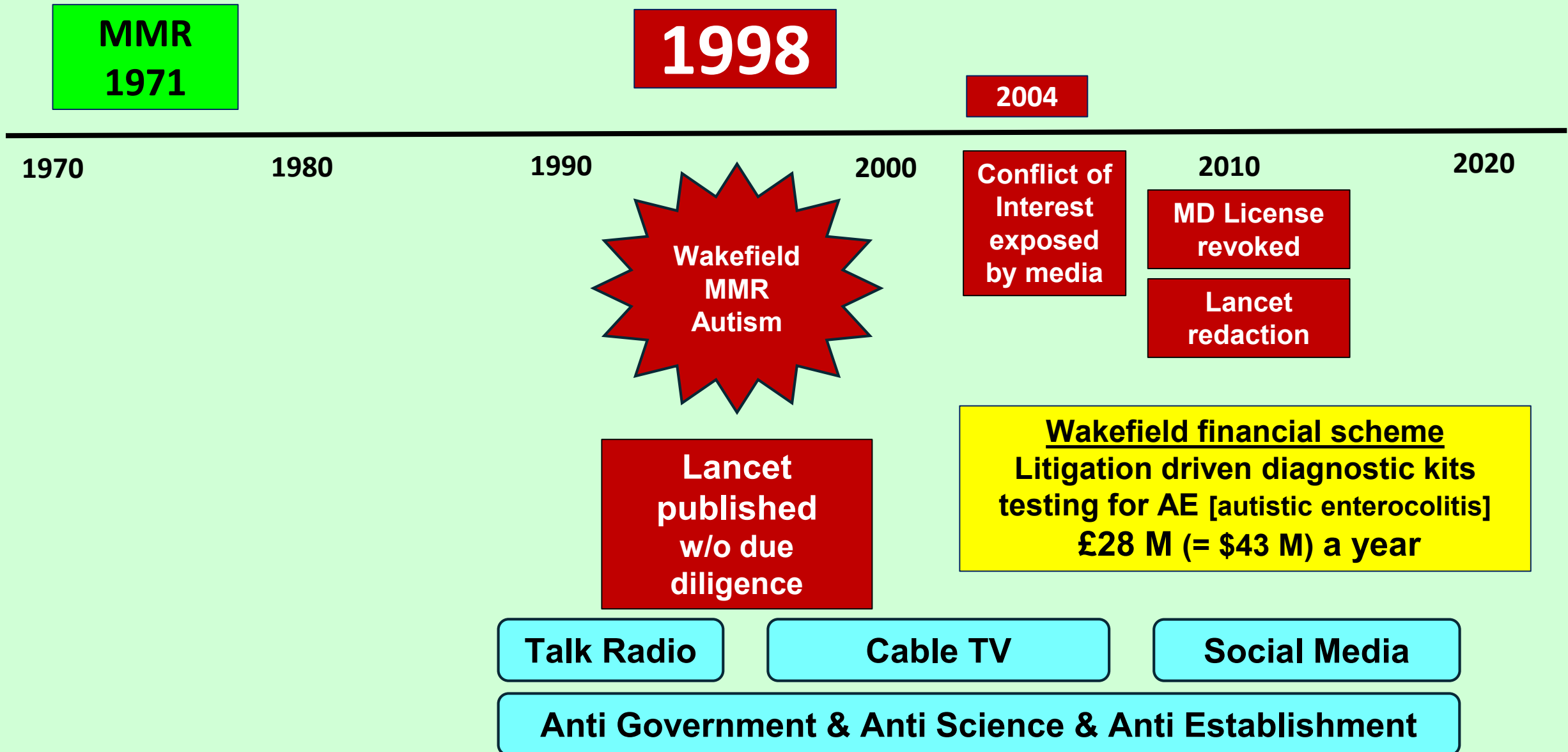
15
years

1996
DTaP
primary
series
approved

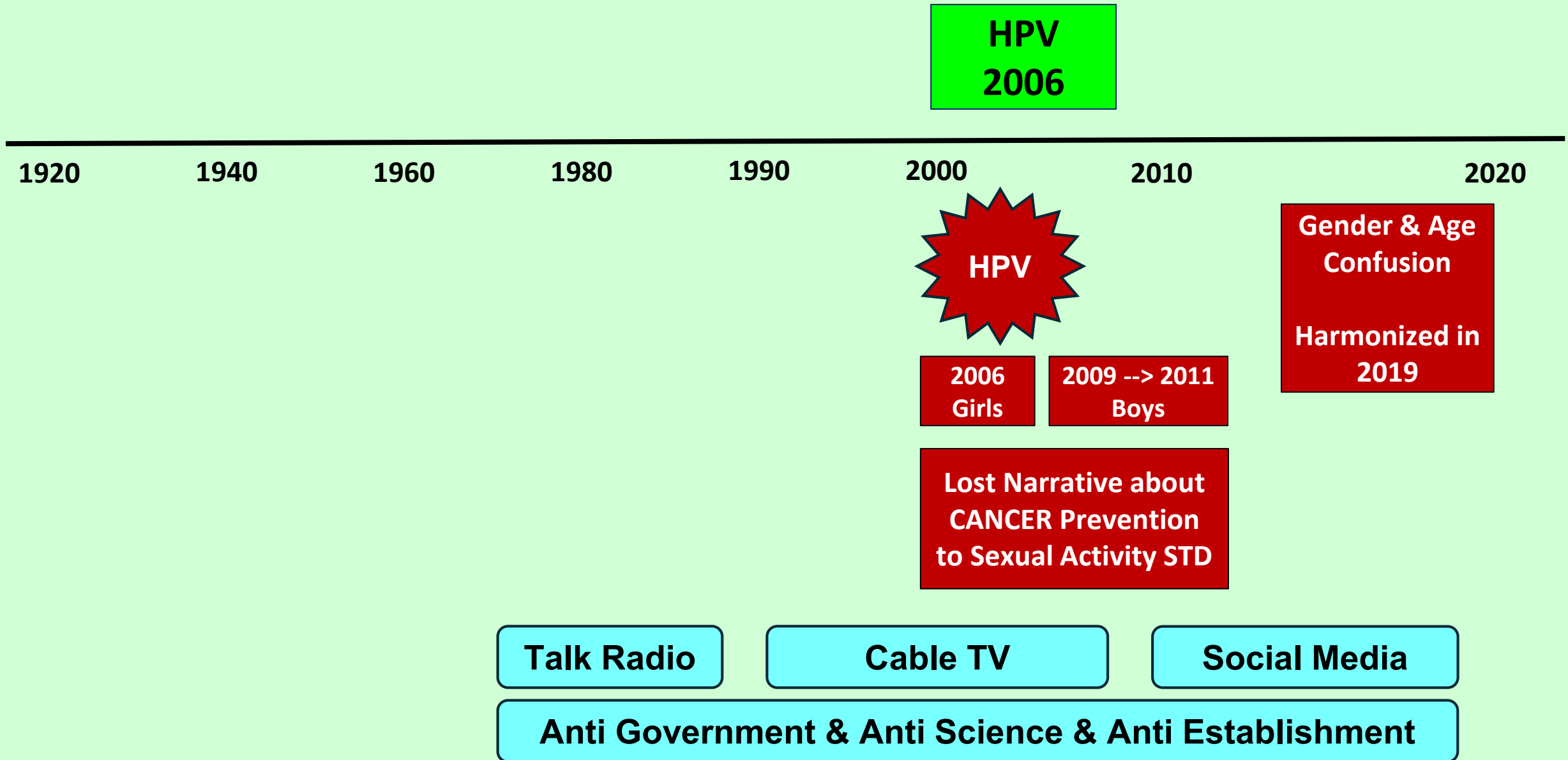
**DTaP
3-5 Antigens**
Pertussis toxoid
Filamentous hemagglutinin
Pertactin
Gimbriae types 2 and 3

Public
perception
too slow?
uncaring?

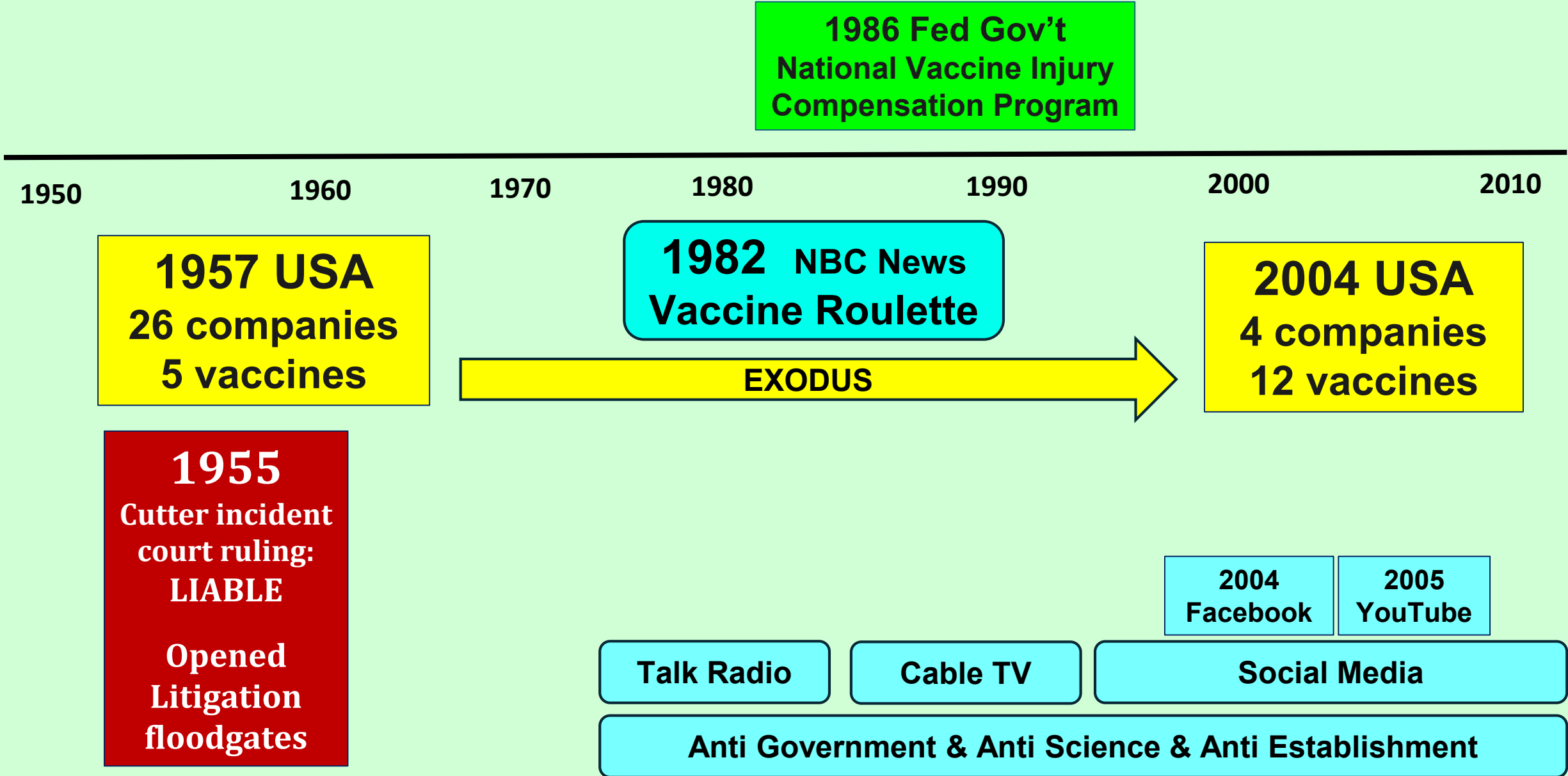
100-year Timeline – Measles Misstep



100-year Timeline – HPV Misstep



100-year Timeline– Vaccine Highlights



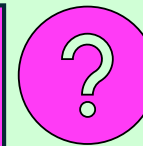
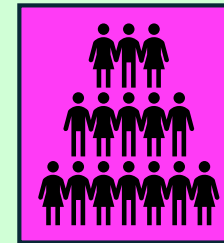
“The best way to predict the future is to create it”

Articulate 3 Vaccine strategies for Arizona by 2030

?

?

?



Indian Health Service

E3 Vaccine Strategy

EVERY Patient,
EVERY Encounter,
EVERY Recommended Vaccine

“The best way to predict the future is to create it”

Lots of areas to Consider . . .

Science	Relationships	Govt - County	New Diseases;
Data	Social Media	Govt - State	New Vaccines
Genetics	Partners	Govt - Federal	Malaria West Nile
Geography	Manufacturers		Zika Yellow
			Dengue Fever
			Chikunga

Articulate 3 Vaccine strategies for Arizona by 2030

“The best way to predict the future is to create it”

Articulate 3 Vaccine strategies for Arizona by 2030



Start @ Personal Level

Pause, take a deep breath & give thanks it's 2026

Be Mindful: MOST People say YES to MOST Vaccines

Understand a NO means “Not Today” choice

Keep Doing the Right Thing; Get & Offer Vaccines

Confidence with Humility – remember History

“The best way to predict the future is to create it”

Articulate 3 Vaccine strategies for Arizona by 2030



Partnerships

**Attend Conferences
with Professional Colleagues**

Join and Promote Organizations
Grandparents for Vaccines, TAPI, AAP, Families for
Vaccines

Promote Social Media Messengers
Dr Noc, Dr Mike, Your Local Epidemiologist, Those
Nerdy Girls

“The best way to predict the future is to create it”

Articulate 3 Vaccine strategies for Arizona by 2030

Vaccination Techniques
Painless

Vaccine Side Effects
Minimize, Mitigate

Combination Vaccines
Fewer shots

Better Data
More Timely Data
& Better Data Visualization

Declination Data
“Measuring what doesn’t happen”

Personalize
Vaccine Information,
Recommendations and Plan

“The best way to predict the future is to create it”

**Person
Centric**

**Individualized Vaccine
Recommendations**

Age

Genetics

Geography

Immune System

History - Vaccines

?

History - Diseases

?

Risk Factors

Household

References :

Timeline of Advisory Committee on Immunization Practices (ACIP) recommendations for diphtheria and tetanus toxoids and acellular pertussis vaccines (DTaP) and tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine (Tdap), 1991 – 2015

<https://www.mayoclinic.org/diseases-conditions/history-disease-outbreaks-vaccine-timeline/whooping-cough>

<https://ourworldindata.org/>

<https://www.cdc.gov/pinkbook/>

<https://www.smithsonianmag.com/smart-news/texas-man-who-lived-70-years-iron-lung-dies-78-never-gave-up-180979008/>

<https://www.bmj.com/press-releases/2012/06/26/revealed-secret-businesses-which-aimed-exploit-vaccine-fears-%E2%80%9CmMr-doctor%E2%80%9D->

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(CHES)

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Social Workers)

Pharmacy Continuing Education

