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Why do we have vaccination programmes?

2017

Vaccine **A**dvice for **C**lini**C**ians **S**ervice (VACCSline)

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Learning objectives

- Explain different factors that inform vaccine policy decisions
- Describe how vaccine programmes are monitored

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Themes to be considered

- Factors that inform vaccine policy
- Who makes decisions about vaccine policy

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Factors to consider

- Scenario: An infectious disease which we do not currently vaccinate against has began to cause an outbreak.

- On your table, discuss the factors to be considered in deciding whether to introduce a vaccine programme

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Factors that inform vaccine policy

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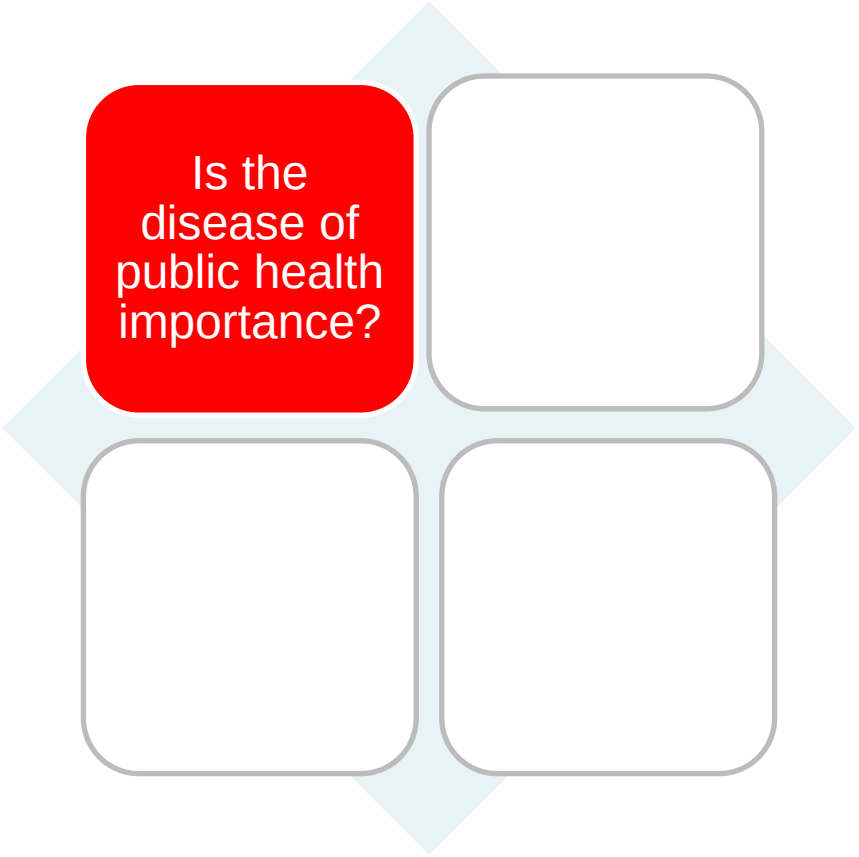
Factors that inform vaccine policy



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Is the disease of public health importance?

Epidemiology

"The study of diseases and how they occur at a population level"

- Incidence
- Trends
- Age distribution
- Complications
- Mortality

Cost

- Treatment
- Disability
- Work time lost

Is the disease of public health importance?

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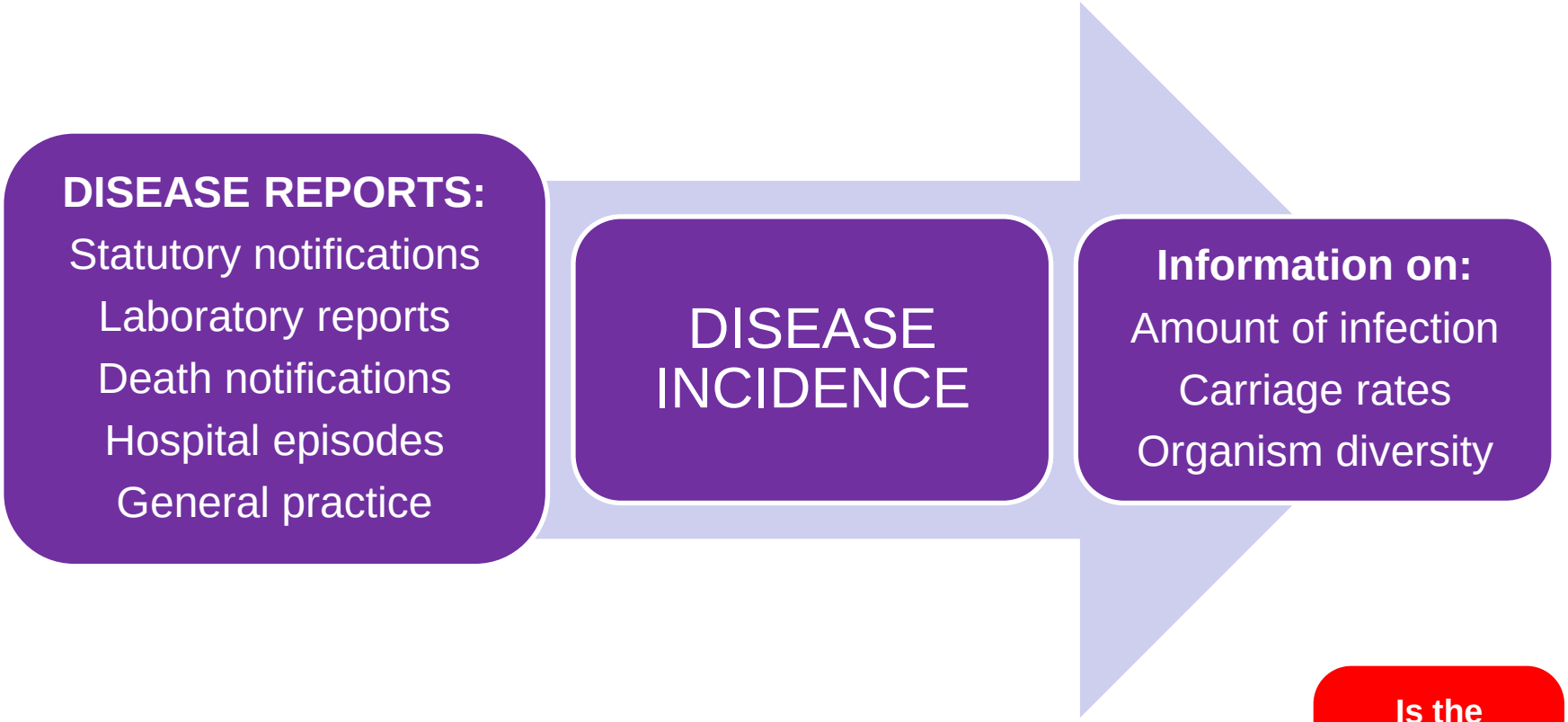
Surveillance



Is the disease of public health importance?

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NOIDs WEEKLY REPORT

STATUTORY NOTIFICATIONS OF INFECTIOUS DISEASES

in ENGLAND and WALES

WEEK 2014/52 week ending 28/12/2014

CONTENTS

Registered Medical Practioner in England and Wales have a statutory duty to notify a Proper Officer of the local authority, often the CCDC (Consultant in Communicable Disease Control), of suspected cases of certain infectious diseases:

Acute encephalitis	Haemolytic uraemic syndrome *	Rubella
Acute infectious hepatitis	Infectious bloody diarrhoea *	SARS *
Acute meningitis	Invasive group A Streptococcal disease	Scarlet fever
Acute poliomyelitis	Legionnaires disease *	Smallpox
Anthrax	Leprosy	Tetanus
Botulism *	Malaria	Tuberculosis
Brucellosis *	Measles	Typhus
Cholera	Meningococcal septicaemia	Viral haemorrhagic fever
Diphtheria	Mumps	Whooping cough
Enteric fever (typhoid or paratyphoid)	Plague	Yellow fever
Food poisoning	Rabies	

** Notifiable from 6th April 2010*

Notifications of infectious diseases, some of which are later microbiologically confirmed, prompt local investigation and action to control the diseases. Proper officers are required every week to inform the PHE (formerly the Registrar General) anonymised details of each case of each disease that has been notified. PHE has responsibilty of collating the weekly returns from proper officers and publishing analyses of local and national trends.

All weekly data are Provisional

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Is the disease of public health importance?

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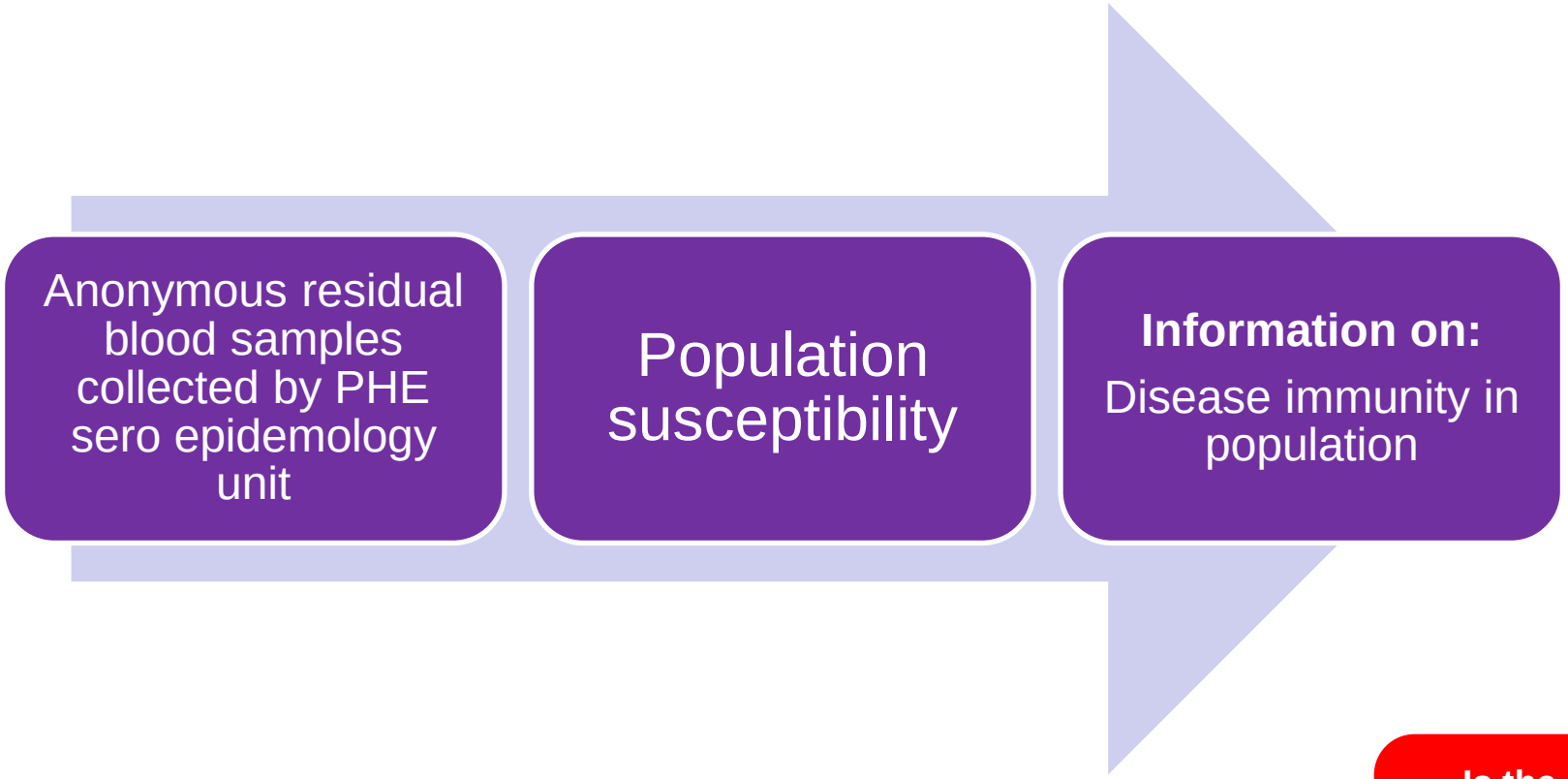
Surveillance



Is the disease of public health importance?

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Pertussis

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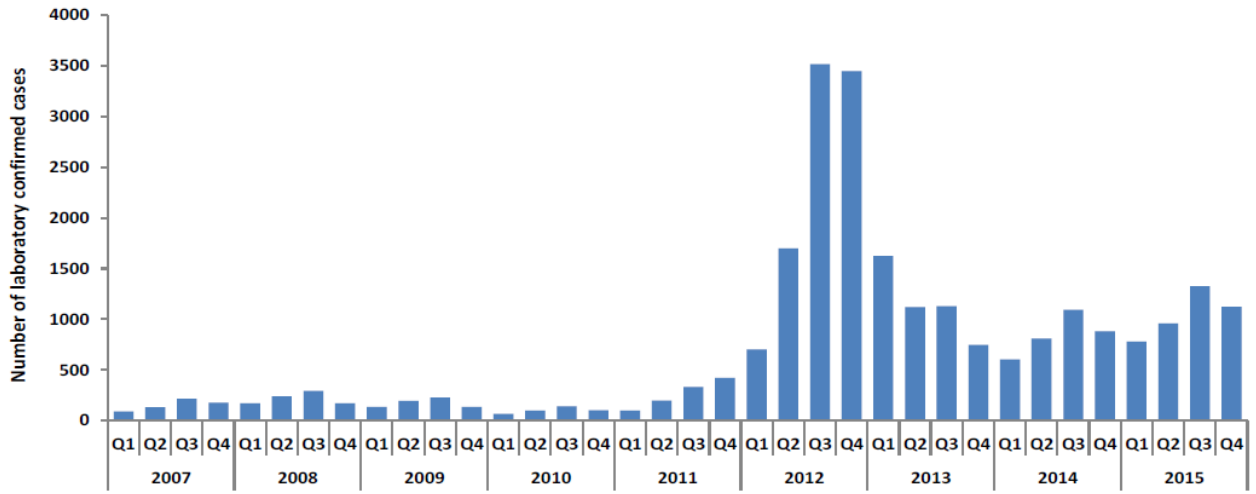
Enhanced Pertussis Surveillance
05/05/2016

Figure 1: Laboratory confirmed cases of Pertussis infection by year and quarter, England: 2007 to 2015*



*2015 are provisional data

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/521440/Figure_1_Laboratory_confirmed_cases_of_Pertussis_infection__England__by_year_and_quarter___2007_to_2015_.pdf

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Is the disease of public health importance?

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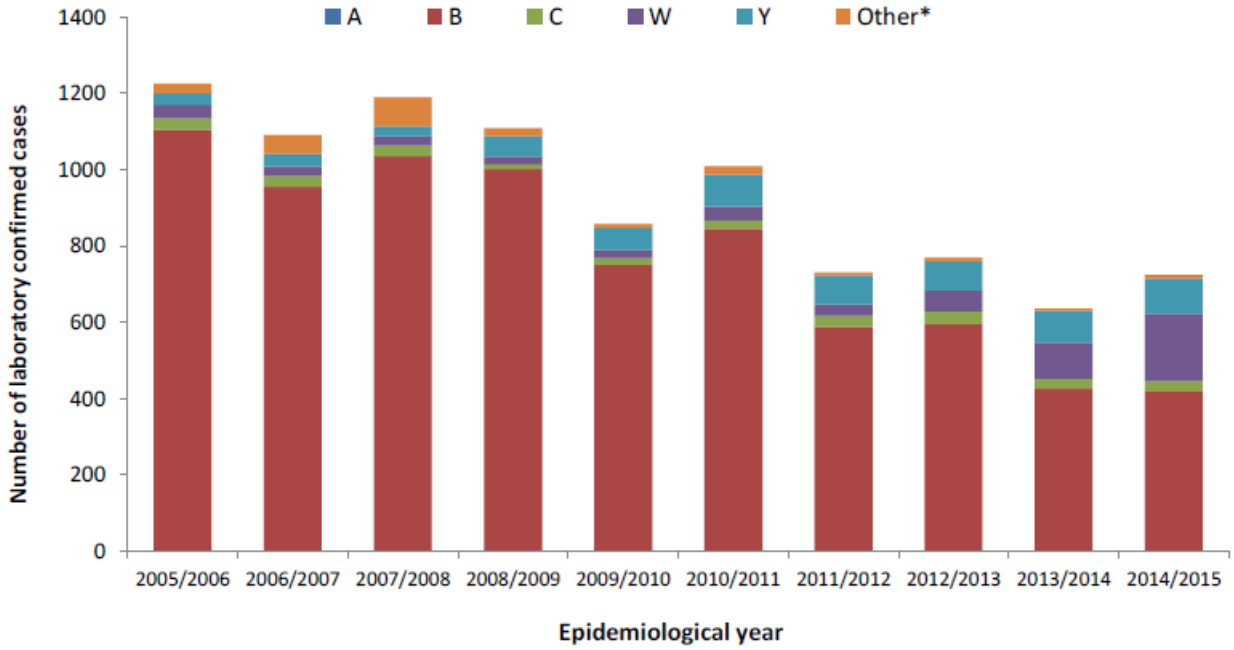
Figure 1. Invasive meningococcal disease in England by capsular group: 2005/2006 to 2014/2015



https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/470602/hpr3815_imd.pdf

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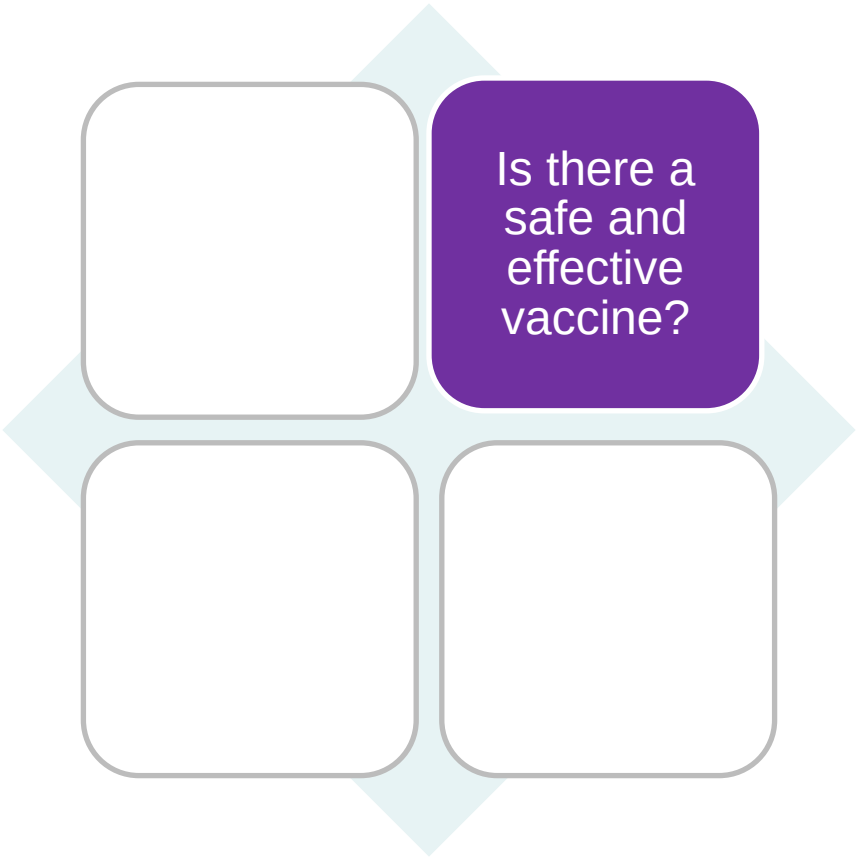
Factors that inform vaccine policy



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Is there a **safe** and **effective** vaccine?

The ideal vaccine...

- **Safe**
- **Effective**
- Single dose
- Lifetime protection
- Easy to administer
- Cheap

Vaccines developed within clinical trials

Is there a safe and effective vaccine?

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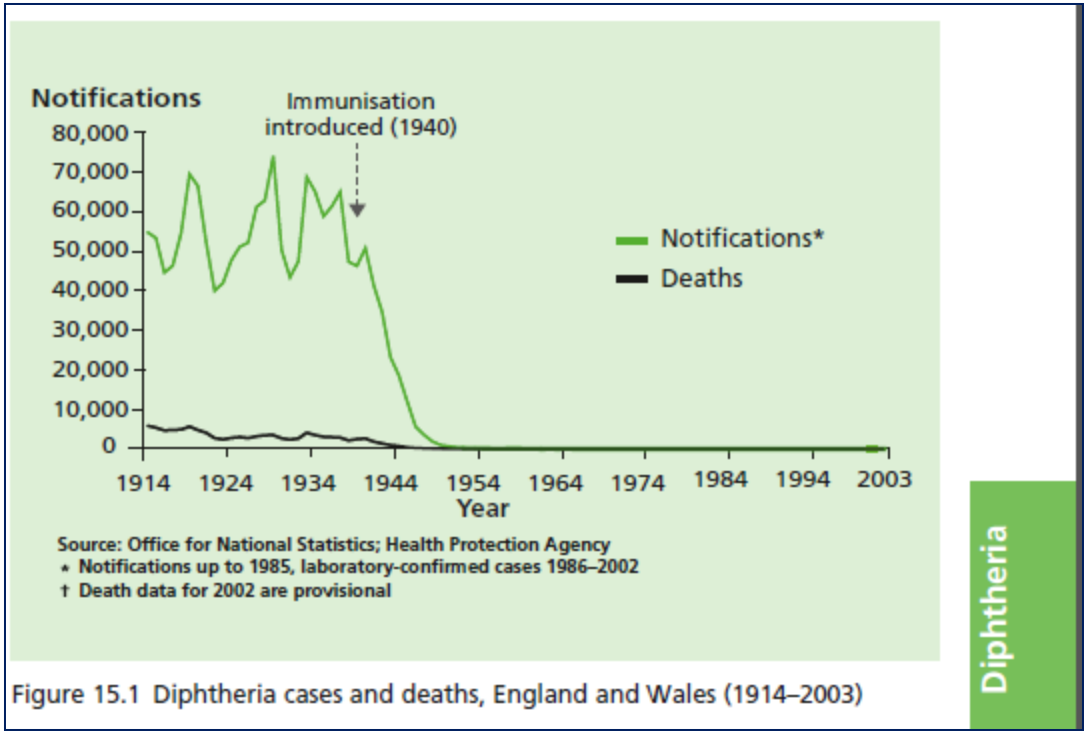
Impact of the vaccination programme

Surveillance “watching” needs to be before and after a vaccine programme is introduced:

- **Before**
  - To estimate burden of disease – this helps design and planning of immunisation programmes

- **After**
  - To check the vaccine strategy is effective in the short and long term

Is there a safe and effective vaccine?



https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/147952/Green-Book-Chapter-15.pdf

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Is there a safe and effective vaccine?

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Surveillance of vaccine programmes

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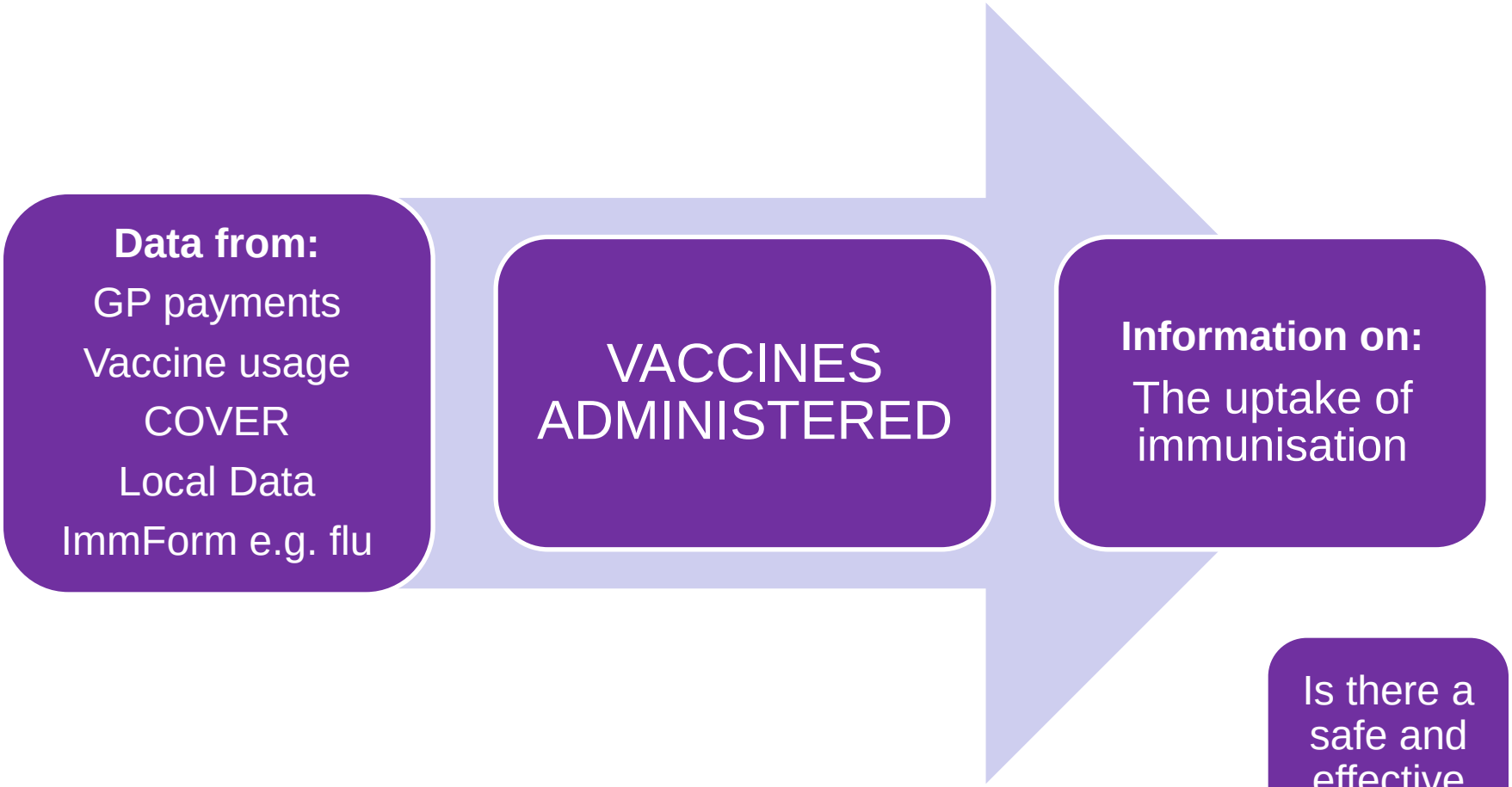

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COVER
(Cover of Vaccination Evaluated Rapidly)

- **CHIS** – Child Health Information System, stores routine immunisation records vaccination all children resident in their area

- **Data collected by PHE** (Centre for Infections) from each CHIS quarterly: number of children who have completed scheduled vaccine courses at 1,2 & 5 years of age
- **Data used to:** evaluate programmes and target improvement work nationally and locally.
- CHIS records rely on accurate recording at practice level

Is there a safe and effective vaccine?

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Who does what?

- **Licensing & monitoring of vaccine safety**

  Medicines and Healthcare products Regulatory Agency

  https://www.gov.uk/government/organisations/medicines-and-healthcare-products-regulatory-agency

- **Purchase of vaccine**

  Department of Health

  https://www.gov.uk/government/organisations/department-of-health

- **Quality assurance and quality control of vaccines**

  National Institute for Biological Standards and Control

  www.nibsc.org/

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Is there a safe and effective vaccine?

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Factors that inform vaccine policy

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Who will we immunise?

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What is the target population?

Universal or selective programme?

Who will we immunise?

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Selective vaccination

Protects individuals at greatest risk of disease:

- **Travel**
  - e.g. Japanese encephalitis
- **Occupational risk**
  - e.g. Anthrax
- **High risk groups**
  - e.g. Hepatitis B vaccine for neonates
- **Outbreak control**
  - e.g. Hepatitis A vaccine

Who will we immunise?

Herd immunity

- **communicable diseases are public diseases**

“My disease puts you at risk, your immunity protects me...“

Who will we immunise?

Herd immunity – scenario 1

- **communicable diseases are public diseases**

„My disease puts you at risk, your immunity protects me...“

If only someone get vaccinated...

Non-vaccinated, infectious

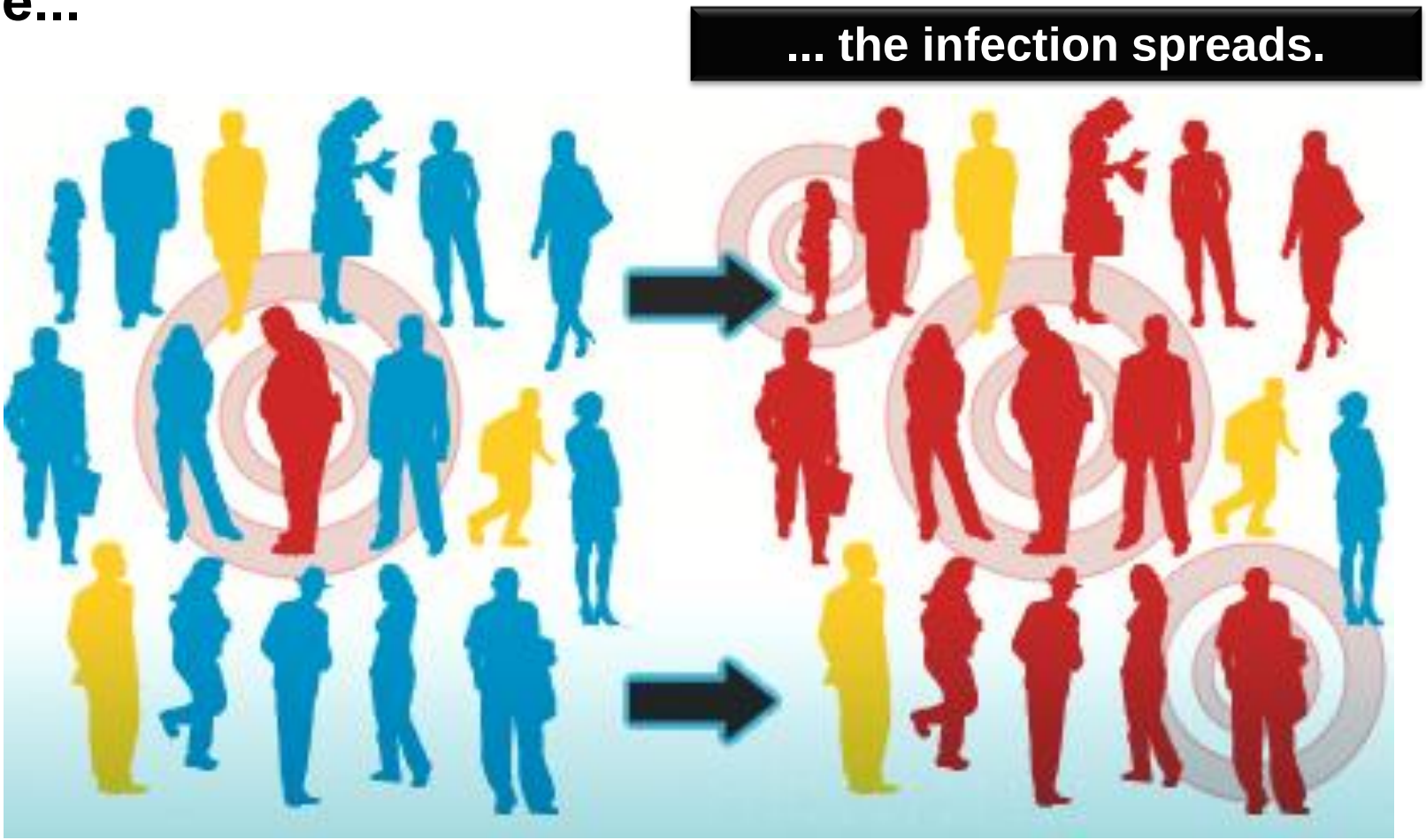
Non-vaccinated, healthy

Vaccinated, healthy

Herd immunity – scenario 1

- communicable diseases are public diseases

„My disease puts you at risk, your immunity protects me...“



Herd immunity – scenario 2

- communicable diseases are public diseases

„My disease puts you at risk, your immunity protects me...“

If critical number of people get vaccinated...

Non-vaccinated, infectious

Non-vaccinated, healthy

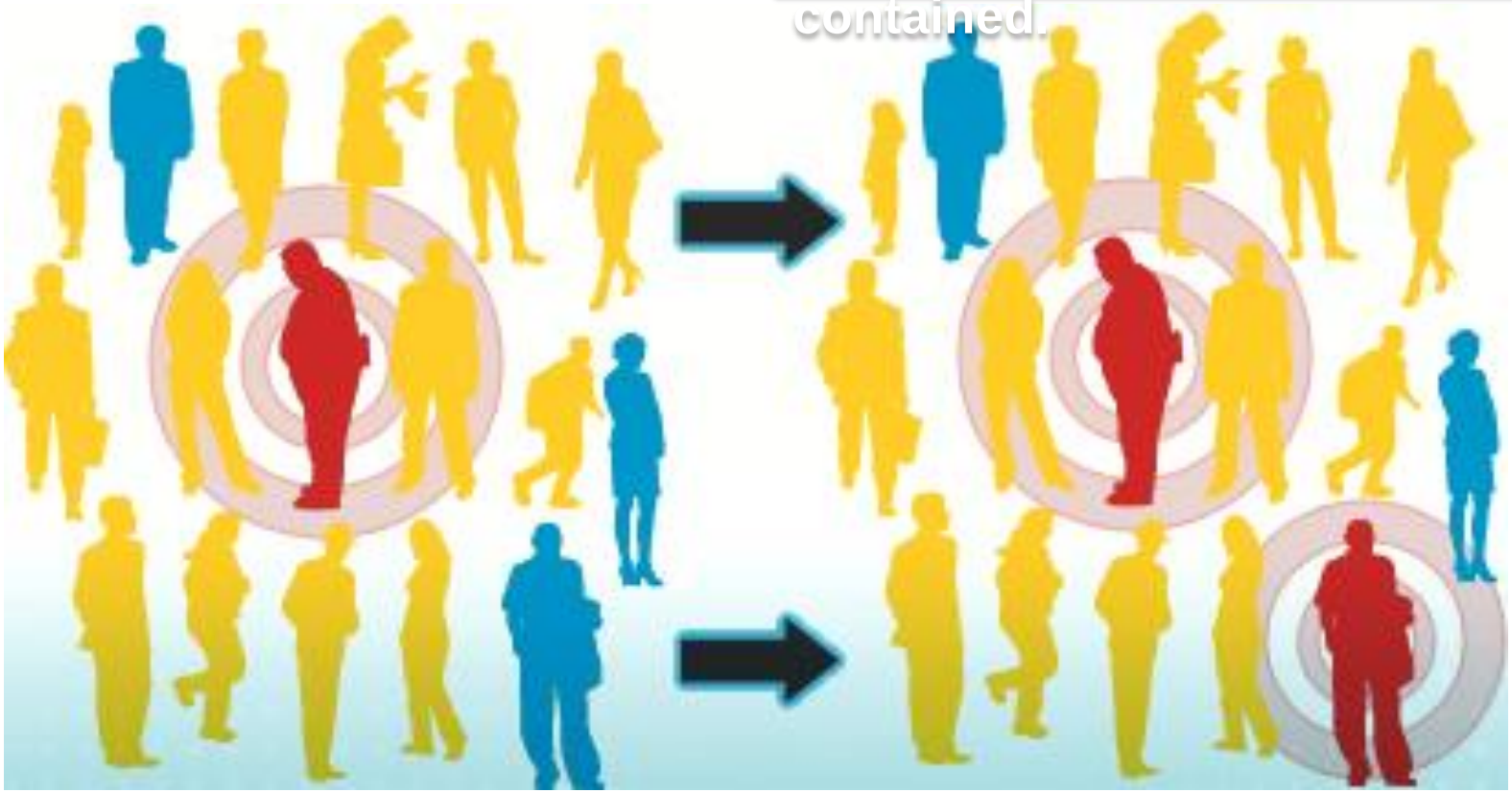
Vaccinated, healthy

Herd immunity – scenario 2

- communicable diseases are public diseases

„My disease puts you at risk, your immunity protects me...“

... disease spreading is contained.



Herd immunity – other diseases

Disease	Average number of people infected by a single person	Proportion of immune individuals needed to stop spreading
Diphtheria	6-7	**85%**
Measles	12-18	**83-94%**
Mumps	4-7	**75-86%**
Pertussis	12-17	**92-94%**
Rubella	5-7	**80-85%**
Polio	5-7	**80-87%**

Modified from Epid Rev 1993;15:265-302, Am J PrevMed2001; 20 (4S): 88-153, MMWR2000; 49 (SS-9);

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Video on herd immunity

https://www.youtube.com/watch?v=CPcC4oGB_o8

Who will we immunise?

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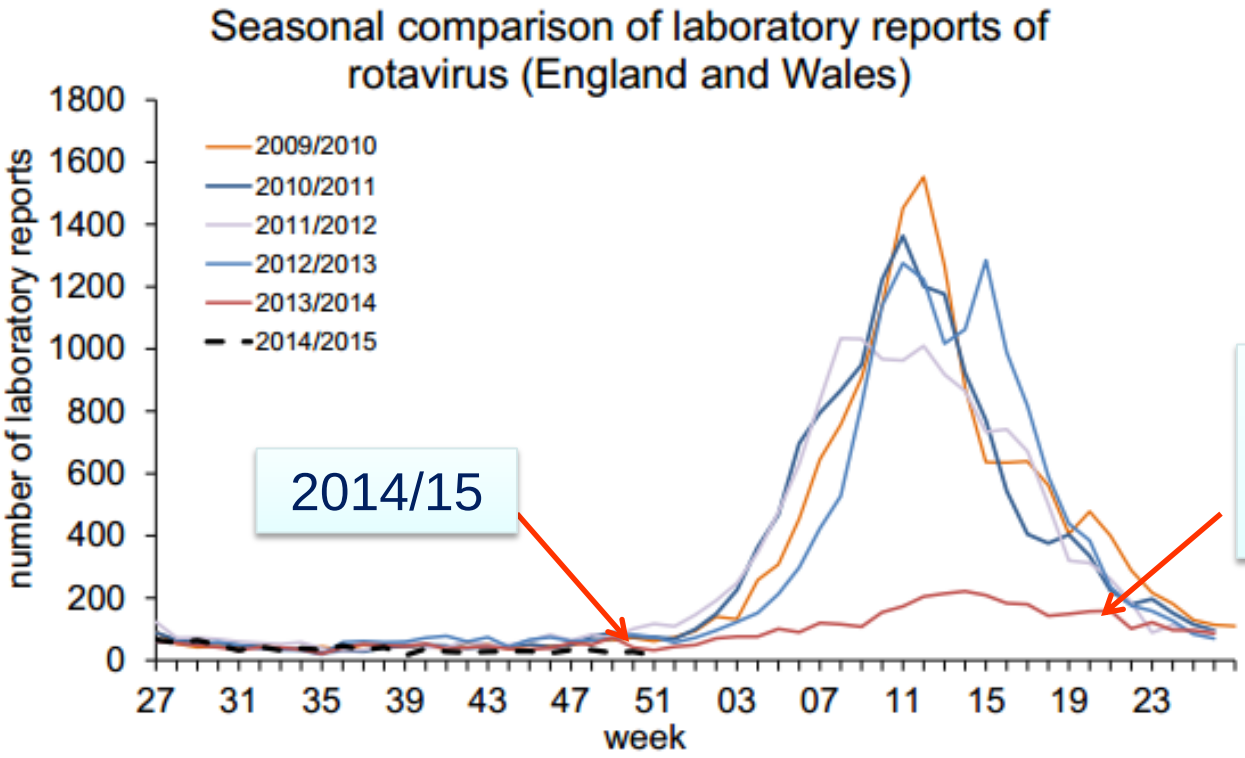
Example of herd immunity

Figure 8: Seasonal comparison of laboratory reports of rotavirus (England and Wales)



2014/15

2013/14 year vaccine introduced

Who will we immunise?

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/391468/Norovirus_update_2015_week_01.pdf

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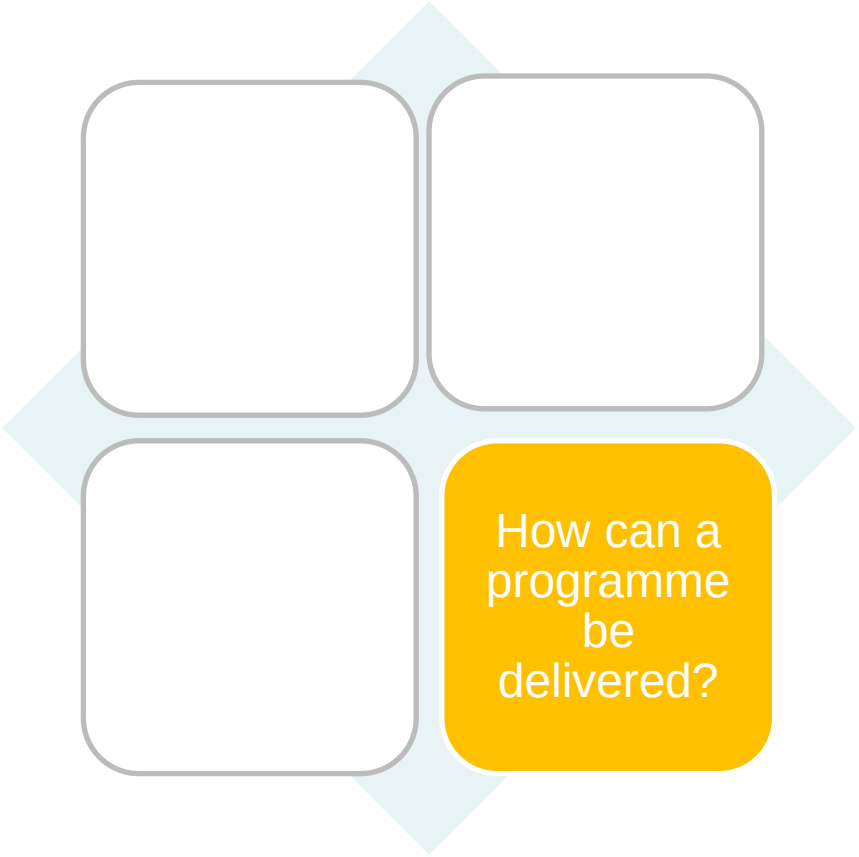
Factors that inform vaccine policy



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Is it do-able?

In the target population:

- Mathematical modelling and cost effectiveness
- Practicalities
  - Organisation and facilities
  - Resources available
  - Population accessibility
  - Training
  - Evaluation

Public attitudes

- Parental acceptance
- Cultural issues
- Severity of disease

How can a programme be delivered?

Reasons for missing immunisations

- Younger children from larger families
- Not in contact with primary care
  - Homeless
  - Asylum seekers
  - Drug users/parents are drug users
  - Travellers
- Minority ethnic groups/English not 1st language
- Young offenders
- Using mental health services
- Looked after children
- Chronic illness/hospitalised
- Educational level/socio-economic disadvantage
- Missed previous vacs
- Physical/learning disabilities
- Teen or lone parents
- Military families
- Rural settings

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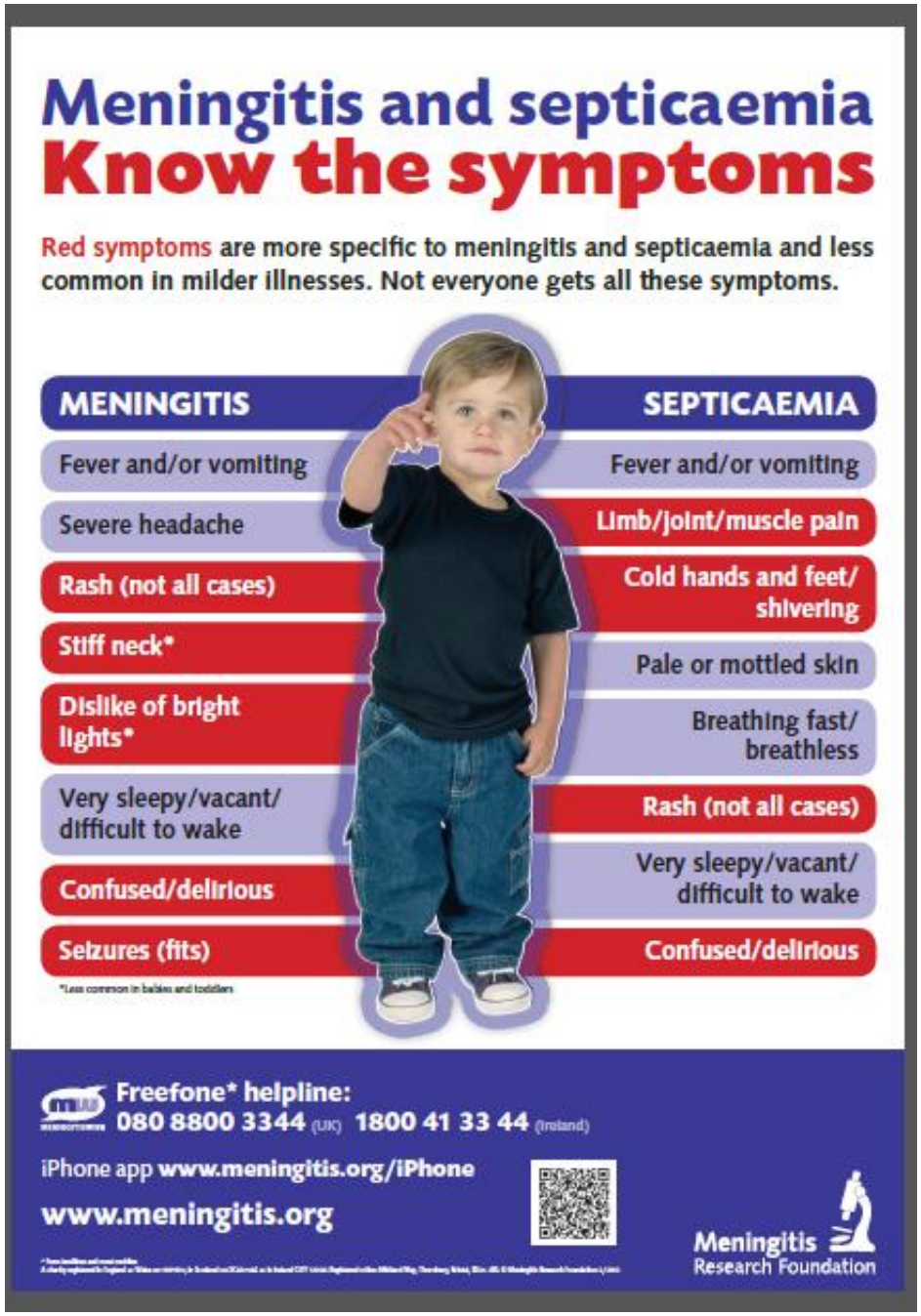

http://www.meningitis.org/assets/x/53218

How can a programme be delivered?

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UK mechanisms for making and implementing of vaccination policy: JCVI

Expert analysis and advice:

Joint Committee on Vaccination and Immunisation (JCVI)

Vaccine policy decisions: Department of Health

Implementation: Public Health England

How can a programme be delivered?

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JCVI remit

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1. Advise UK health departments on immunisations for the prevention of infections and/or disease following due consideration of the evidence:
    - burden of disease
    - vaccine safety and efficacy
    - impact and cost effectiveness of immunisation strategies

2. Consider and identify factors for successful and effective implementation of immunisation strategies.

3. Identify important knowledge gaps relating to immunisations or immunisation programmes where further research and/or surveillance should be considered

Minutes accessed at:

https://www.gov.uk/government/groups/joint-committee-on-vaccination-and-immunisation#minutes

How can a programme be delivered?

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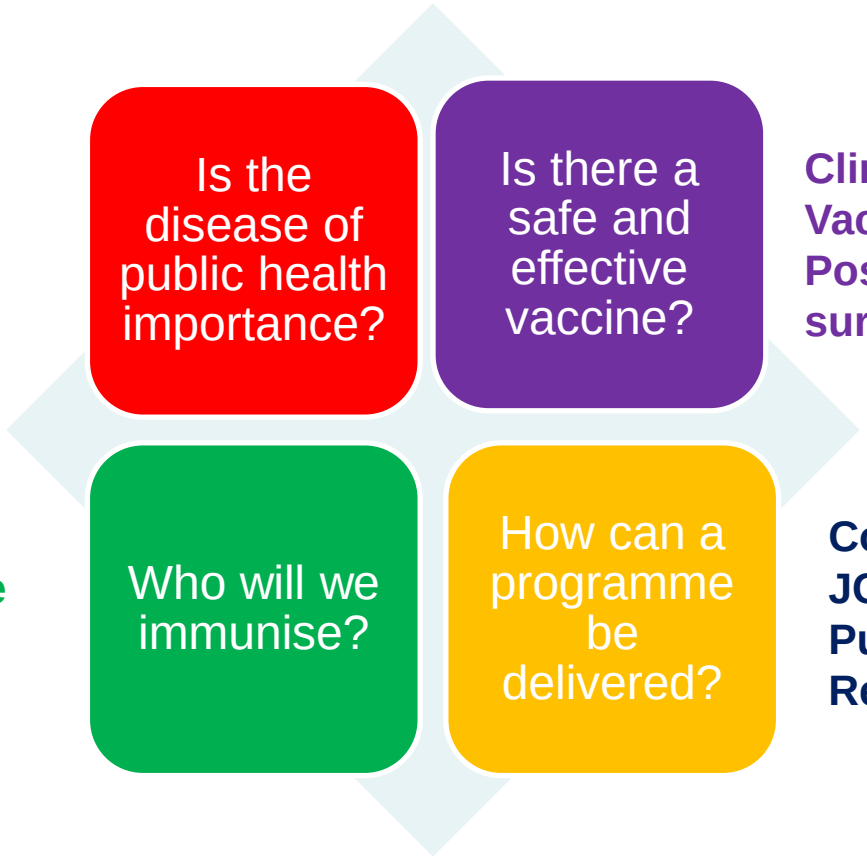
Factors that inform vaccine policy

Number of cases
Severity of disease
Public concept
Cost of disease



Clinical trials
Vaccine availability
Post implementation surveillance

Who is at most risk?
Universal vs selective
Herd immunity

Cost effectiveness
JCVI recommendation
Public acceptance
Resources