




# MENINGITIS

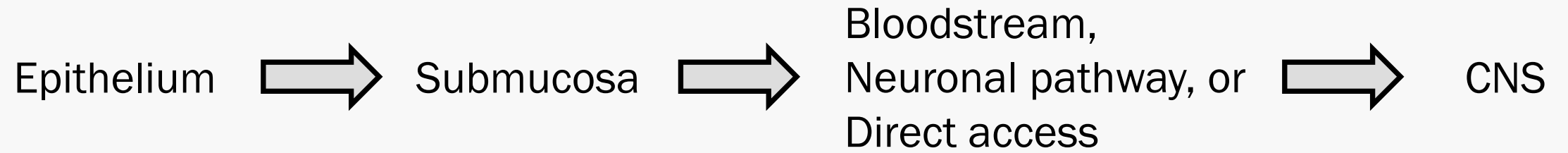
Grace Burgin  
March 5, 2022





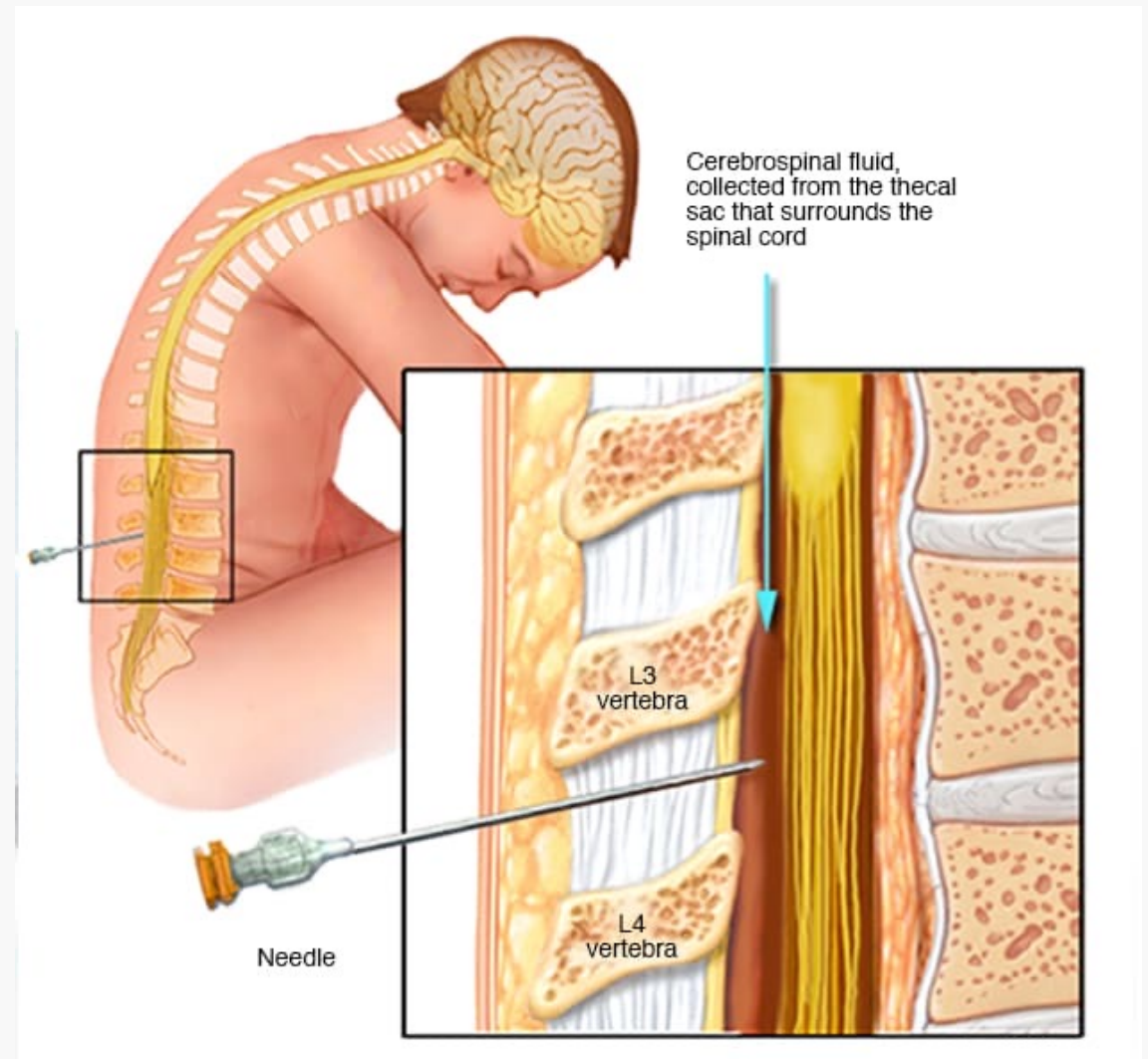
# *NEISSERIA MENINGITIDIS*

# Meningococcal Infection



# Meningococcal Infection, continued

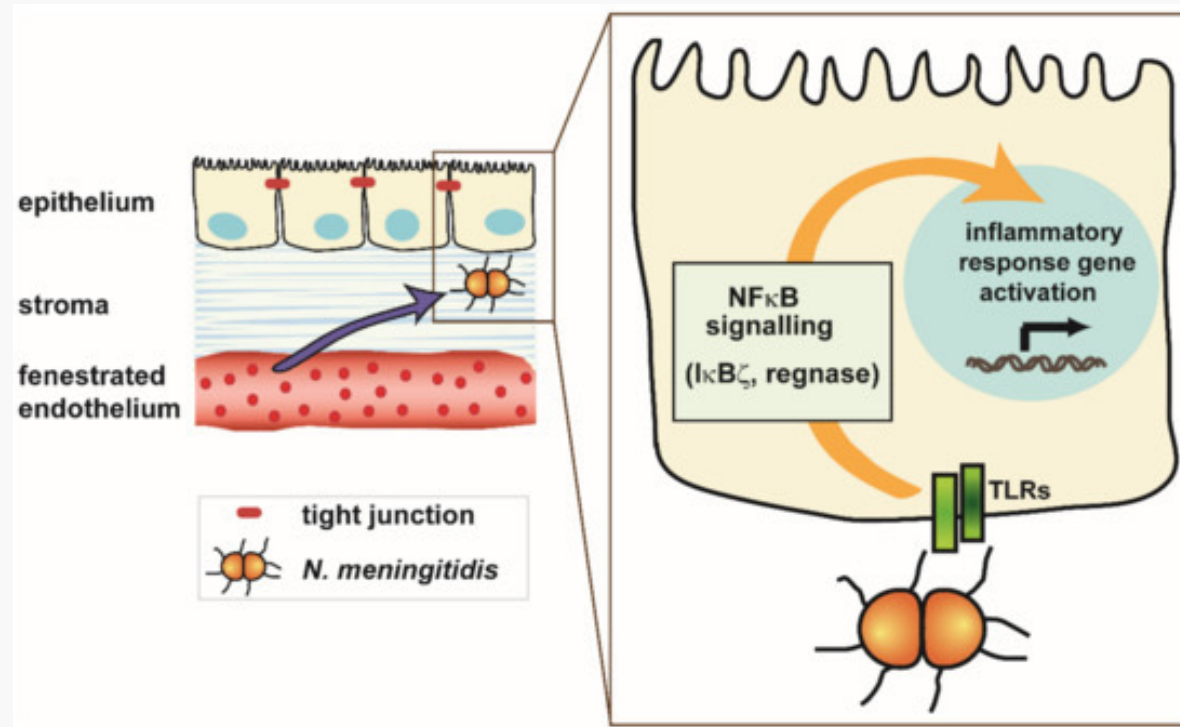
- How is it spread?
- How is it diagnosed?
- What are the symptoms?
- What is the prognosis?



<https://www.mayoclinic.org/tests-procedures/lumbar-puncture/about/pac-20394631>



# MENINGITIS OUTBREAKS

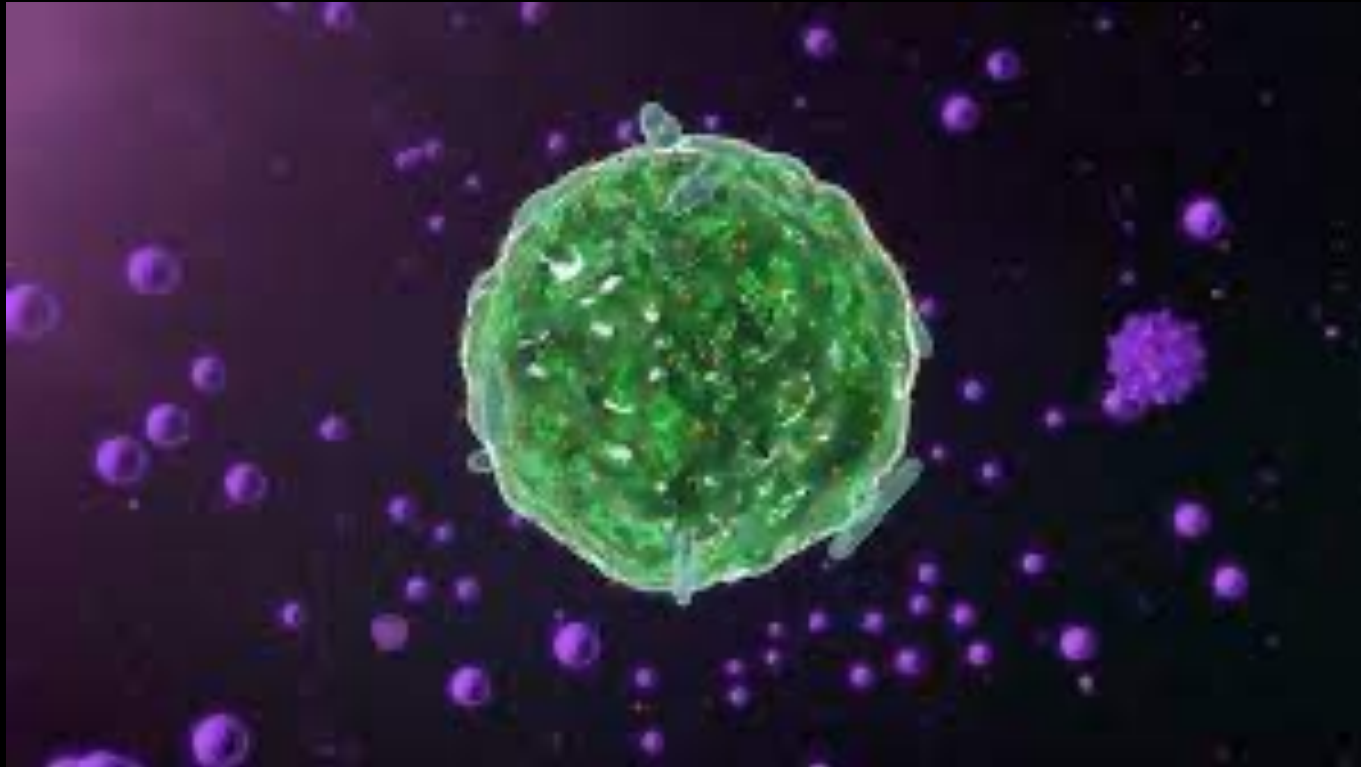


(Borowski et al., 2020)

# RECOGNITION OF THE PATHOGEN



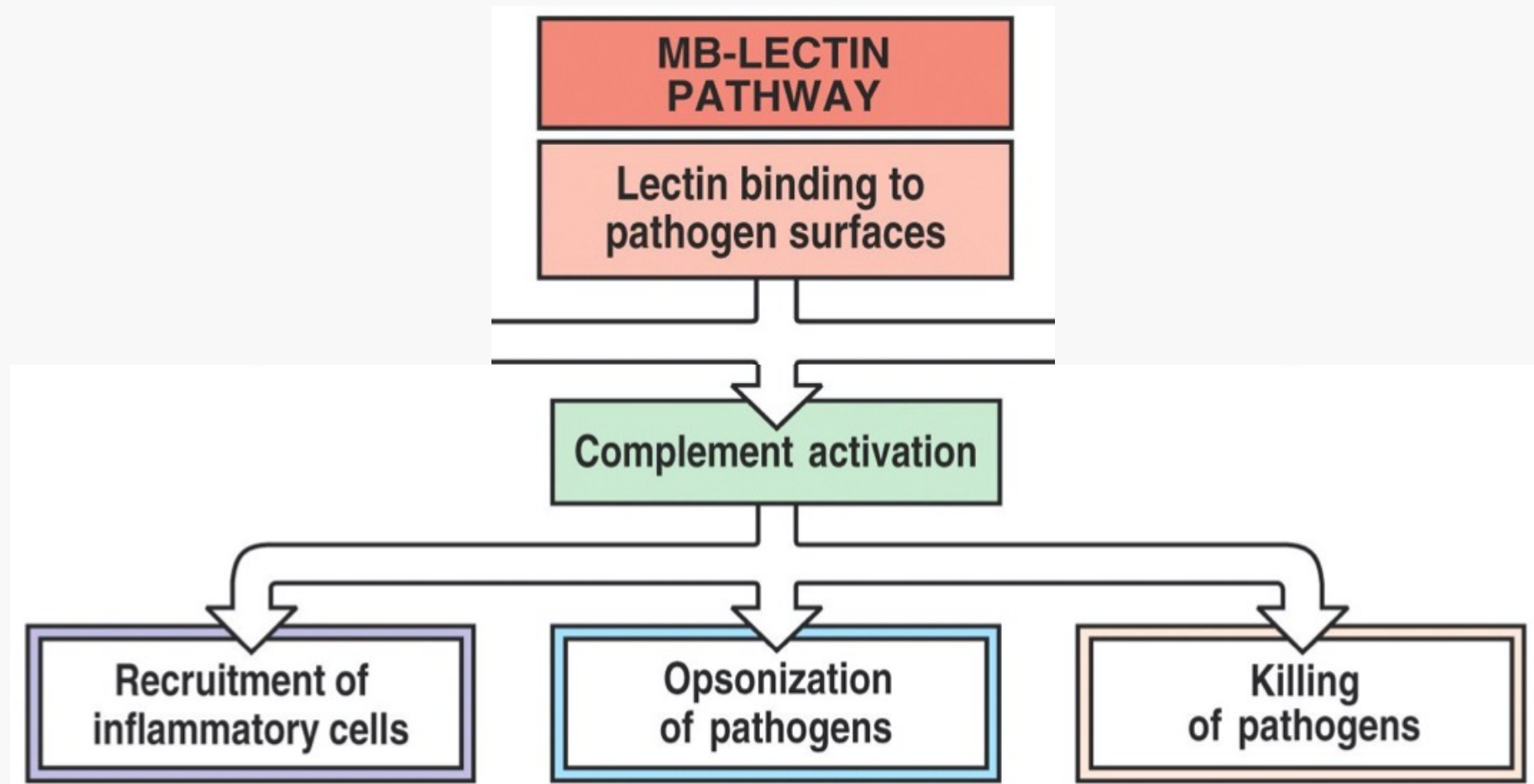
# Cytokines and Other Inflammatory Mediators



- IL-1
- IL-6
- IL-8
- PGE2
- PAF

<https://www.livescience.com/what-are-cytokines.html>

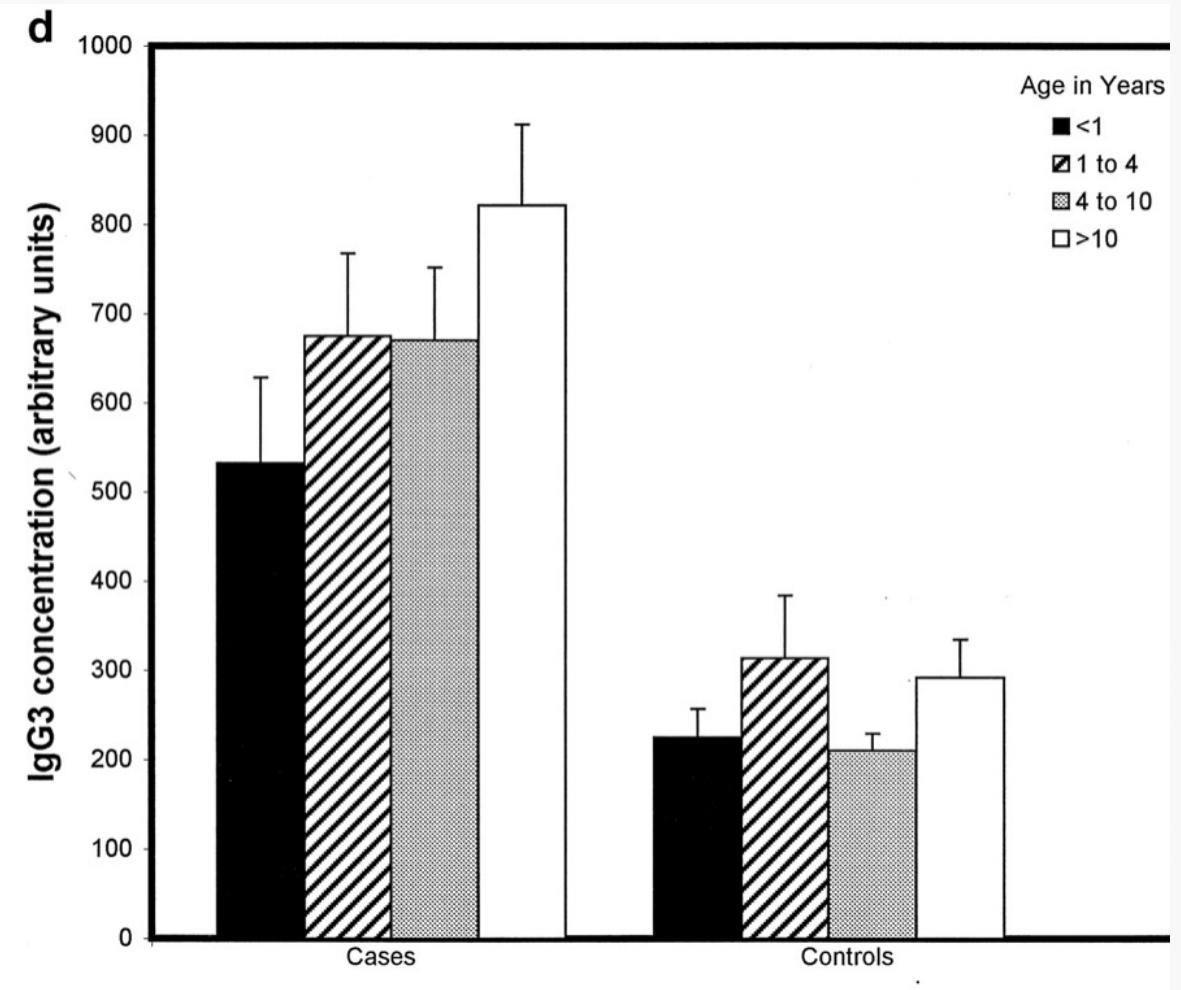
# Complement





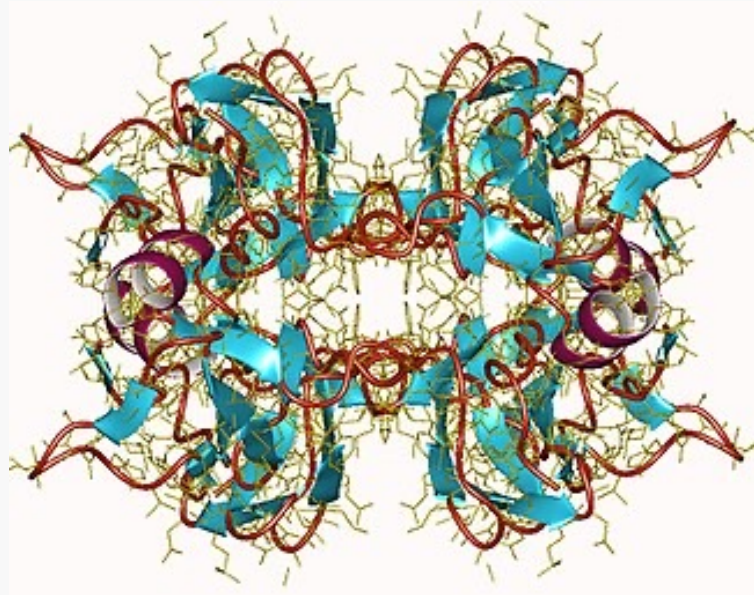
## *Humoral immune responses to Neisseria meningitidis in children*

- Methods: ELISA, blood samples, PCR
- Results:
  - Most antibody produced in children was IgG1 and IgG3
  - Bactericidal activity of antibodies in children under 12 months was low
  - Bactericidal activity of antibodies highest in children over 10 years



(Pollard et al., 2020)

<https://jasn.asnjournals.org/content/29/6/1649>



# EVADING THE IMMUNE SYSTEM



# TREATMENT OPTIONS

- IV antibiotics
- Corticosteroids
- Sinus draining
- At-home care
- Supplemental oxygen





# Vaccine Development

- First vaccine made available in 1978
- Menactra (MVC4)
- Meneveo (MenACWY-CRM)
- Trumenba (MenB-FHbp)
- Bexsero (MenB-4C)

# Vaccine Administration

- Target population
- Dosing frequency
- Location



<https://ecgtraining.co.uk/locating-the-correct-position-on-the-deltoid-for-an-injection/>



<https://vaccine-safety-training.org/vaccine-reactions.html>

## EFFICACY AND SIDE EFFECTS

# *Safety, immunogenicity, and antibody persistence of a new meningococcal group A conjugate vaccine in healthy Indian adults*

Double-blind, randomized, controlled study on the PsA-TT vaccine

## Methods:

- Doses given to healthy volunteers aged 18-35
- Blood samples, baby rabbit complement, ELISA

## Results:

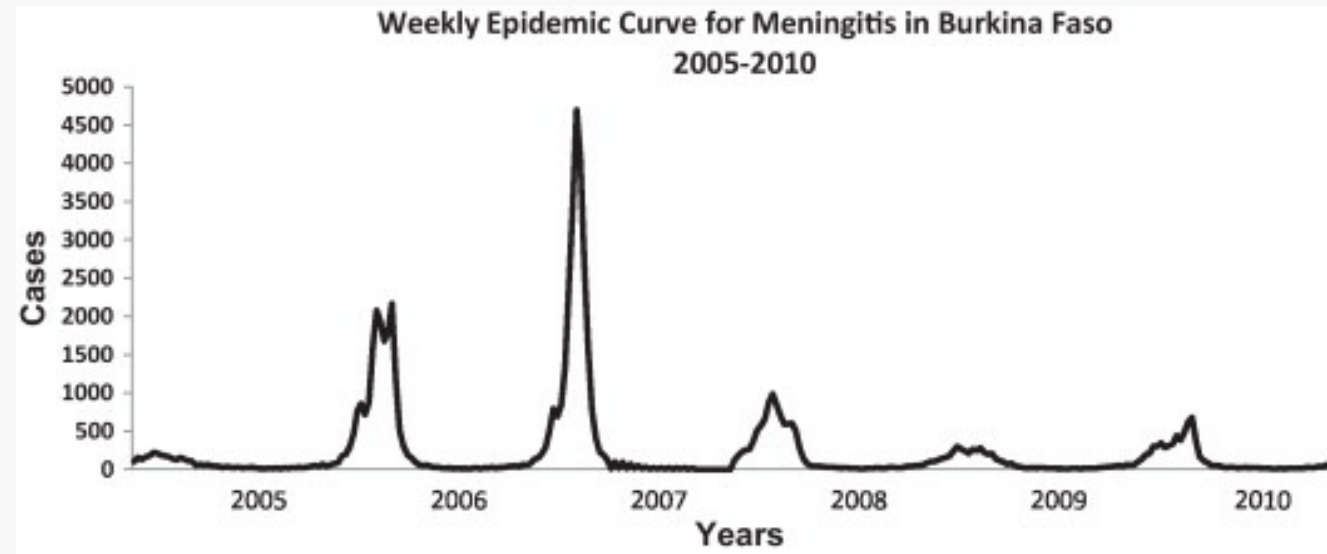
- Adverse events
- SBA levels
- Serogroup A-specific IgG

(Kshirsagar et al., 2007)



## *Effectively introducing a new meningococcal A conjugate vaccine in Africa: The Burkina Faso experience*

- MenAfriVac vaccine introduced to Burkina Faso in 2010
- Methods:
  - Single 10 mcg dose given to the 1-29-year-old population
  - CSF samples, PCR
- Results:
  - 11.4 million people vaccinated in 10 days
  - Early surveillance data



(Djingarey et al., 2012)



SIGNIFICANCE

# References

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- World Health Organization. (2021, September 28). *Meningitis*. <https://www.who.int/news-room/fact-sheets/detail/meningitis>



The background features several overlapping circles and organic shapes in various shades of gray. These shapes are filled with different patterns: some have a dense grid of small dots, others have a pattern of small dashes or lines, and some are solid gray. The overall effect is a complex, layered texture.

QUESTIONS?