



Smallpox Bibliography November 2003

1: Am J Epidemiol. 2003 Oct 15;158(8):717-23.

Analysis of historical data suggests long-lasting protective effects of smallpox vaccination.

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More than half of the US population has received the smallpox vaccine, but it is unknown what fraction is still protected against infection and disease. Residual protection and age-dependent case-fatality ratios have therefore been widely neglected in the current bioterrorism debate. The author analyzed 1902-1903 data from Liverpool, United Kingdom, and from reintroductions of the disease to Europe in 1950-1971 to estimate to what degree vaccinated cases were protected against developing severe or fatal disease and how quickly this protection waned over time. Protection against severe and fatal disease was lost at the rate of 1.41% per year, corresponding to a half-life of 49.2 years (95% confidence interval: 42.0, 57.3), and protection against fatal disease alone declined 0.363% per year. Thus, even 70 years after primary vaccination, 77.6% of cases were still protected (95% confidence interval: 66.6, 85.4). Protection against severe disease should therefore extend for many decades after a single vaccination, and protection against death from smallpox may even be lifelong for the majority of vaccinees. This protection should greatly reduce the number of severe and fatal cases of disease expected in a bioterrorist attack, but residual protection may also increase the risk that some previously vaccinated cases who develop mild disease may remain unrecognized longer, while moving around freely and disseminating the infection.

Publication Types:

Historical Article

PMID: 14561660 [PubMed - indexed for MEDLINE]

2: Arch Dis Child. 2003 Oct;88(10):841.

Smallpox vaccination.

Kula S.

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Publication Types:

Biography

Historical Article

Personal Name as Subject:

Montagu MW

PMID: 14500295 [PubMed - indexed for MEDLINE]

3: BMJ. 2003 Oct 25;327(7421):948.

Smallpox bioterrorist conference highlights divisions over vaccines.

Fleck F.

Publication Types:

News

PMID: 14576234 [PubMed - indexed for MEDLINE]

4: Cutis. 2003 Jul;72(1):43-6.

Skin reaction following immunization with smallpox vaccine: a personal perspective.

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Concerns about the possibility of bioterrorism or unconventional weaponry using the variola virus have emerged following the events of September 11, 2001.

Immunization of emergency personnel in Israel against smallpox started in

September 2002. This case report describes the skin reaction following

immunization with vaccinia virus. Physicians should be aware of the variations at the site of the inoculation.

PMID: 12889714 [PubMed - indexed for MEDLINE]

5: Expert Opin Pharmacother. 2003 Aug;4(8):1207-14.

Under scrutiny: smallpox vaccine recommendations.

Kemper AR, Davis MM.

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The eradication of smallpox is widely considered to be one of the great achievements of public health. However, international terrorism in the US and elsewhere has led to increasing concern about vulnerability to a smallpox bioterror attack. Timely vaccination is highly protective against smallpox but carries risks of morbidity and mortality. Significant debate has therefore emerged regarding the optimal strategy for defence. In principle, there are three options: either mass or limited vaccination prior to an attack; quarantine and vaccination of all suspected cases of smallpox following an attack with isolation and vaccination of potential case contacts; and mass vaccination after the identification of a case of smallpox. This paper reviews smallpox disease, smallpox vaccination and the development of current smallpox vaccination policy in the US. Mathematical models of the spread of smallpox and control strategies are reviewed to explore specific smallpox vaccine policy considerations. Limitations of these models are considered and recommendations are made for future research.

Publication Types:

Review

Review, Academic

PMID: 12877631 [PubMed - indexed for MEDLINE]

6: J Allergy Clin Immunol. 2003 Oct;112(4):810-4.

Comment in:

J Allergy Clin Immunol. 2003 Oct;112(4):683-5.
Prometheus in Gloucestershire: Edward Jenner, 1749-1823.
Mullin D.
The Edward Jenner Museum, Berkeley, Gloucestershire, United Kingdom.
Publication Types:
Biography
Historical Article
Personal Name as Subject:
Jenner E
PMID: 14564373 [PubMed - indexed for MEDLINE]

7: J Allergy Clin Immunol. 2003 Oct;112(4):683-5.
Comment in:
J Allergy Clin Immunol. 2003 Oct;112(4):675-82.
Comment on:
J Allergy Clin Immunol. 2003 Oct;112(4):667-74.
J Allergy Clin Immunol. 2003 Oct;112(4):686-94.
J Allergy Clin Immunol. 2003 Oct;112(4):810-4.
Risks of smallpox vaccination: 200 years after Jenner.
Plaut M, Tinkle SS.
Publication Types:
Comment
Editorial
Review
Review, Tutorial
PMID: 14564344 [PubMed - indexed for MEDLINE]

8: J Biosci. 2003 Mar;28(2):141-4.
Mysteries of the smallpox vaccine.
Bhattacharya S.
The Wellcome Trust Centre for the History of Medicine at University College
London, Euston House, 24 Eversholt Street, London NW1 1AD, UK.
sanjoy.bhattacharya@ucl.ac.uk
PMID: 12711804 [PubMed - indexed for MEDLINE]

9: J Clin Microbiol. 2003 Aug;41(8):3687-9.
New generation of cell culture assay for smallpox vaccine potency.
Leparc-Goffart I, Poirier B, El Zaouk A, Tissier MH, Fuchs F.
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France. Isabelle.Leparc-Goffart@afssaps.sante.fr
The potency of smallpox vaccines produced in the 1970s was tested by titration
onto chorioallantoic membranes of fertilized hen eggs (CAM assay). The potency
specification commonly approved for these vaccines was a titer above 10(8)
pock-forming units per milliliter. We developed and validated a cell culture
titration assay to have a more reliable potency test. The cell titration assay
and the CAM assay were tested in parallel on 34 first-generation smallpox
vaccine lots. These allowed us to demonstrate that a correlation does exist
between the two titration techniques and to determine a new in-house
specification for the cell titration method. This in vitro potency assay will
allow us to test first-generation smallpox vaccines produced on the skin of
living animals but will also give a hint of the potency specification that
should be assigned for new generations of cell-derived smallpox vaccines.

PMID: 12904376 [PubMed - indexed for MEDLINE]

10: J Infect Dis. 2003 Oct 1;188(7):973-6. Epub 2003 Sep 16.

Effectiveness of postexposure vaccination for the prevention of smallpox: results of a delphi analysis.

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We estimated the effectiveness of postexposure smallpox vaccination in preventing or modifying disease in naive and previously vaccinated adults, using the formal Delphi technique. For persons not previously vaccinated, the median effectiveness in preventing disease with vaccination at 0-6 h, 6-24 h, and 1-3 days after exposure was estimated as 93%, 90%, and 80%, respectively, and effectiveness in modifying disease among those who develop illness was estimated as 80%, 80%, and 75%, respectively. Effectiveness was greater for those vaccinated previously. High postexposure vaccination effectiveness for preventing or modifying smallpox is consistent with the limited data available, is biologically plausible, and is similar to that seen for other viral vaccine-preventable diseases. These estimates support the Advisory Committee on Immunization Practices recommendations and provide a key parameter for mathematical models on which policy decisions may be based.

PMID: 14513416 [PubMed - indexed for MEDLINE]

11: J Virol. 2003 Oct;77(19):10684-8.

Development and use of a vaccinia virus neutralization assay based on flow cytometric detection of green fluorescent protein.

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A rapid and sensitive neutralization assay is required to evaluate alternative smallpox vaccines. Here we describe the development and use of a 96-well plate, semi-automated, flow cytometric assay that uses a recombinant vaccinia virus expressing enhanced green fluorescent protein and which would be applicable to other viruses.

PMID: 12970455 [PubMed - indexed for MEDLINE]

12: JAMA. 2003 Oct 22;290(16):2123-4; author reply 2124.

Comment on:

JAMA. 2003 Jun 25;289(24):3278-82.

JAMA. 2003 Jun 25;289(24):3283-9.

Safety of the smallpox vaccine among military recipients.

Nass M.

Publication Types:

Comment

Letter

PMID: 14570942 [PubMed - indexed for MEDLINE]

13: Kennedy Inst Ethics J. 2003 Jun;13(2):67-82.

Should smallpox vaccine be made available to the general public?

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In June 2002, the Advisory Committee on Immunization Practices (ACIP) approved draft recommendations concerning preparation for potential biological terror attacks that utilize the smallpox virus. ACIP recommends against both mandatory and voluntary vaccination of the general public. The present paper examines the moral and political considerations both for and against each of the general public vaccination options considered by the ACIP in the context of the state's authority over vaccination for the purposes of protecting public health. Although it is clear that compulsory mass vaccination is not justified at this time, the issues surrounding voluntary vaccination are more complex. Should smallpox vaccination prior to an outbreak be made available to the general public? The paper concludes that the vaccine should not be made available at this time. This conclusion, however, is based upon contingent features of current circumstances, which would change once an outbreak occurred. In the event of a terror-related outbreak of smallpox, the general public's access to voluntary vaccination would become justified, even in areas beyond where the outbreak has occurred.

PMID: 14569990 [PubMed - indexed for MEDLINE]

14: Math Biosci. 2003 Sep;185(1):33-72.

Analyzing bioterror response logistics: the case of smallpox.

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To evaluate existing and alternative proposals for emergency response to a deliberate smallpox attack, we embed the key operational features of such interventions into a smallpox disease transmission model. We use probabilistic reasoning within an otherwise deterministic epidemic framework to model the 'race to trace', i.e., attempting to trace (via the infector) and vaccinate an infected person while (s)he is still vaccine-sensitive. Our model explicitly incorporates a tracing/vaccination queue, and hence can be used as a capacity planning tool. An approximate analysis of this large (16 ODE) system yields closed-form estimates for the total number of deaths and the maximum queue length. The former estimate delineates the efficacy (i.e., accuracy) and efficiency (i.e., speed) of contact tracing, while the latter estimate reveals how congestion makes the race to trace more difficult to win, thereby causing more deaths. A probabilistic analysis is also used to find an approximate closed-form expression for the total number of deaths under mass vaccination, in terms of both the basic reproductive ratio and the vaccination capacity. We also derive approximate thresholds for initially controlling the epidemic for more general interventions that include imperfect vaccination and quarantine.

PMID: 12900141 [PubMed - indexed for MEDLINE]

15: Nature. 2003 Oct 16;425(6959):681-5.

Planning for smallpox outbreaks.

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Mathematical models of viral transmission and control are important tools for assessing the threat posed by deliberate release of the smallpox virus and the best means of containing an outbreak. Models must balance biological realism against limitations of knowledge, and uncertainties need to be accurately

communicated to policy-makers. Smallpox poses the particular challenge that key biological, social and spatial factors affecting disease spread in contemporary populations must be elucidated largely from historical studies undertaken before disease eradication in 1979. We review the use of models in smallpox planning within the broader epidemiological context set by recent outbreaks of both novel and re-emerging pathogens.

Publication Types:

Review

Review, Tutorial

PMID: 14562094 [PubMed - indexed for MEDLINE]

16: Nature. 2003 Sep 25;425(6956):332.

Vaccine claim lifts company's stock but angers researchers.

Check E.

Publication Types:

News

PMID: 14508447 [PubMed - indexed for MEDLINE]

17: Proc Natl Acad Sci U S A. 2003 Sep 2;100(18):10564-7. Epub 2003 Aug 14.

Group interest versus self-interest in smallpox vaccination policy.

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The recent threat of bioterrorism has fueled debate on smallpox vaccination policy for the United States. Certain policy proposals call for voluntary mass vaccination; however, if individuals decide whether to vaccinate according to self-interest, the level of herd immunity achieved may differ from what is best for the population as a whole. We present a synthesis of game theory and epidemic modeling that formalizes this conflict between self-interest and group interest and shows that voluntary vaccination is unlikely to reach the group-optimal level. This shortfall results in a substantial increase in expected mortality after an attack.

PMID: 12920181 [PubMed - indexed for MEDLINE]

18: Semin Pediatr Infect Dis. 2003 Jul;14(3):189-95.

Adverse events occurring after smallpox vaccination.

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We reviewed the literature on adverse events reported to occur after smallpox vaccination. Nearly one-half of the United States population is vaccinia-naive and may be at risk for development of serious adverse events. We describe the clinical features of postvaccinial central nervous system disease, progressive vaccinia, eczema vaccinatum, accidental implantations, "generalized vaccinia," and the common erythematous and/or urticarial rashes. In the 1960s, death occurred approximately once in every million primary vaccinations, with fatalities resulting from progressive vaccinia, postvaccinial encephalitis, and eczema vaccinatum. Death in revaccinees occurred less commonly and almost entirely from progressive vaccinia. In today's population, death rates might be higher because of the increased prevalence of immune deficiency and atopic dermatitis.

Publication Types:

Review
Review, Tutorial
PMID: 12913830 [PubMed - indexed for MEDLINE]

19: Vaccine. 2003 Mar 28;21(13-14):1382-90.
Smallpox vaccination techniques. 2. Accessories and aftercare.
Baxby D.

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The various accessories used for smallpox vaccination are surveyed. These included modified vaccination instruments and various other items which facilitated the procedure, containers for preservation and transport of vaccine, sterilising equipment, aids to interpretation and recording, and a variety of skin preparations and dressings. Three phases can be discerned in the development and use of such items and procedures. Initially, in the pre-bacteriological era, there was little need for accessory equipment apart from the means of preserving and transporting vaccine. Later, particularly by the end of the 19th century, the importance of aseptic and antiseptic procedures was realised, use was made of more traumatic vaccination techniques and glass capillaries became the standard method for preservation and transport. All this led to the increasing availability of a wide range of accessories, particularly of skin preparations and dressings. Finally, from about 1930, it was appreciated that skin preparation and dressings were often unnecessary, and could be counter-productive. So, although accessories for this were still available their use was very much reduced. In some respects the use of accessories during this last phase, based on scientific analysis was a return to the earliest, 'pre-scientific', era.

Publication Types:

Review
Review, Tutorial
PMID: 12615434 [PubMed - indexed for MEDLINE]