



# **Vaccinations against smallpox and tuberculosis are associated with better long-term survival**

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**Bandim Health Project  
Guinea-Bissau**

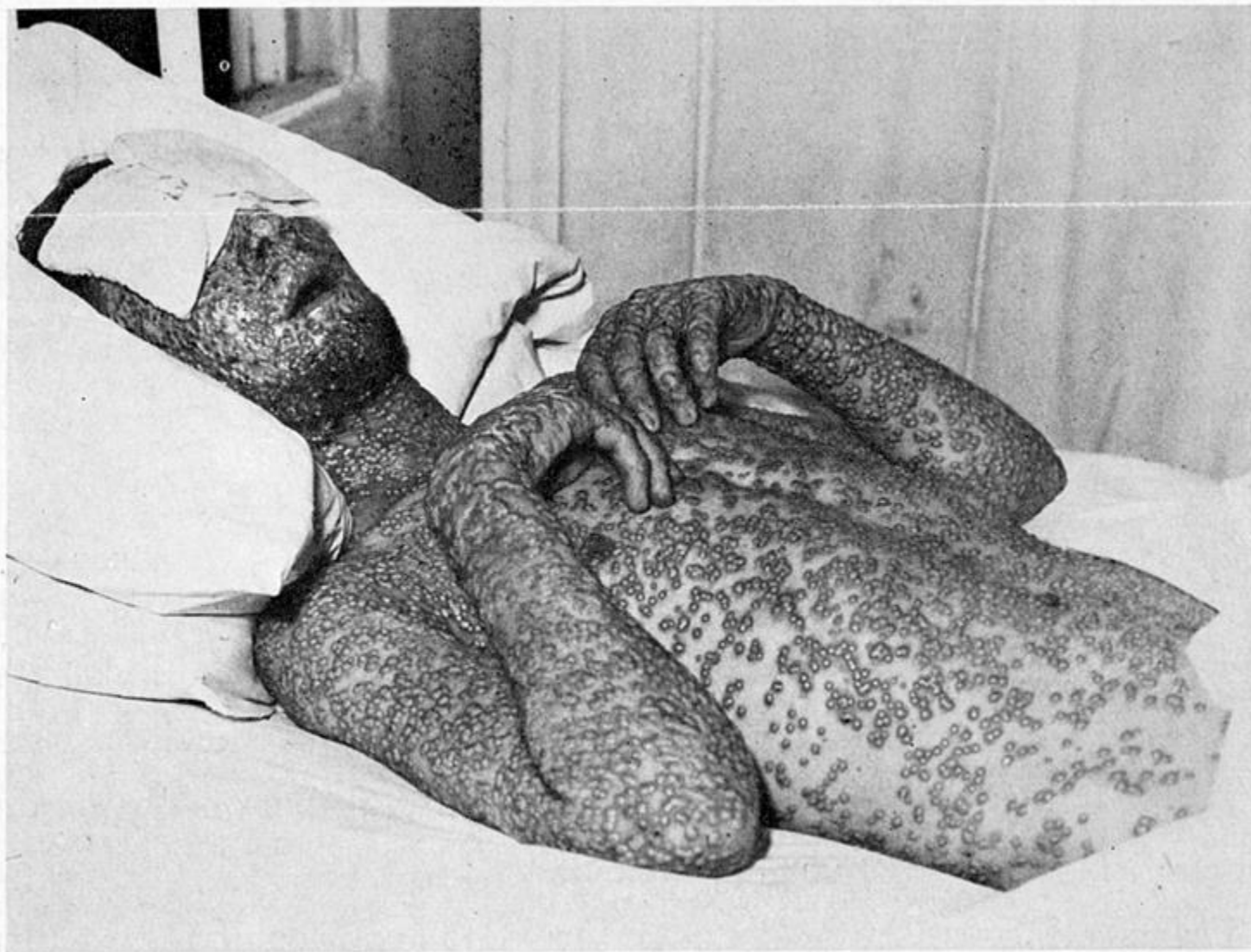
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**cb@ssi.dk**





*The Cow-Pock — or — the Wonderful Effects of the New Inoculation! —* Pubd June 10. 1800. by H. Monro. 2y 3d. James & Co. *vide. the Publications of the Anti-Vaccine Society*



*New York State Department of Health Photograph*

Institute of Microbiology, Infectious and Epidemic Diseases of the Veterinary Faculty, Ludwig-Maximilian University, Munich, Bavaria

## Taking Advantage of the Positive Side-Effects of Smallpox Vaccination

A. MAYR

vaccinators. For instance, Dr Gierl (first Bavarian vaccinator) writes: ‘In connection with my vaccinations, I noticed that eye and ear disorders not only improved but also disappeared, that chronic diseases vanished: convulsions ceased to occur, rashes of all kinds improved.’ He goes on to say: ‘...the vaccination is therefore being used not only as a protection against Variola vera, but also as a cure for a number of diseases.’ In the

In Paschen’s manual (Paschen, 1930), further observations of a similar nature are listed, e.g. ‘Dubousquet-Laborderie and Barthelmy even showed in numerous schoolchildren and asylum occupants that vaccinated persons are less susceptible to infectious diseases such as measles, scarlet fever, whooping cough than non-vaccinated persons.’ Or, to cite another few

# Smallpox vaccination one of the main reasons for population growth in Europe in early 19th century

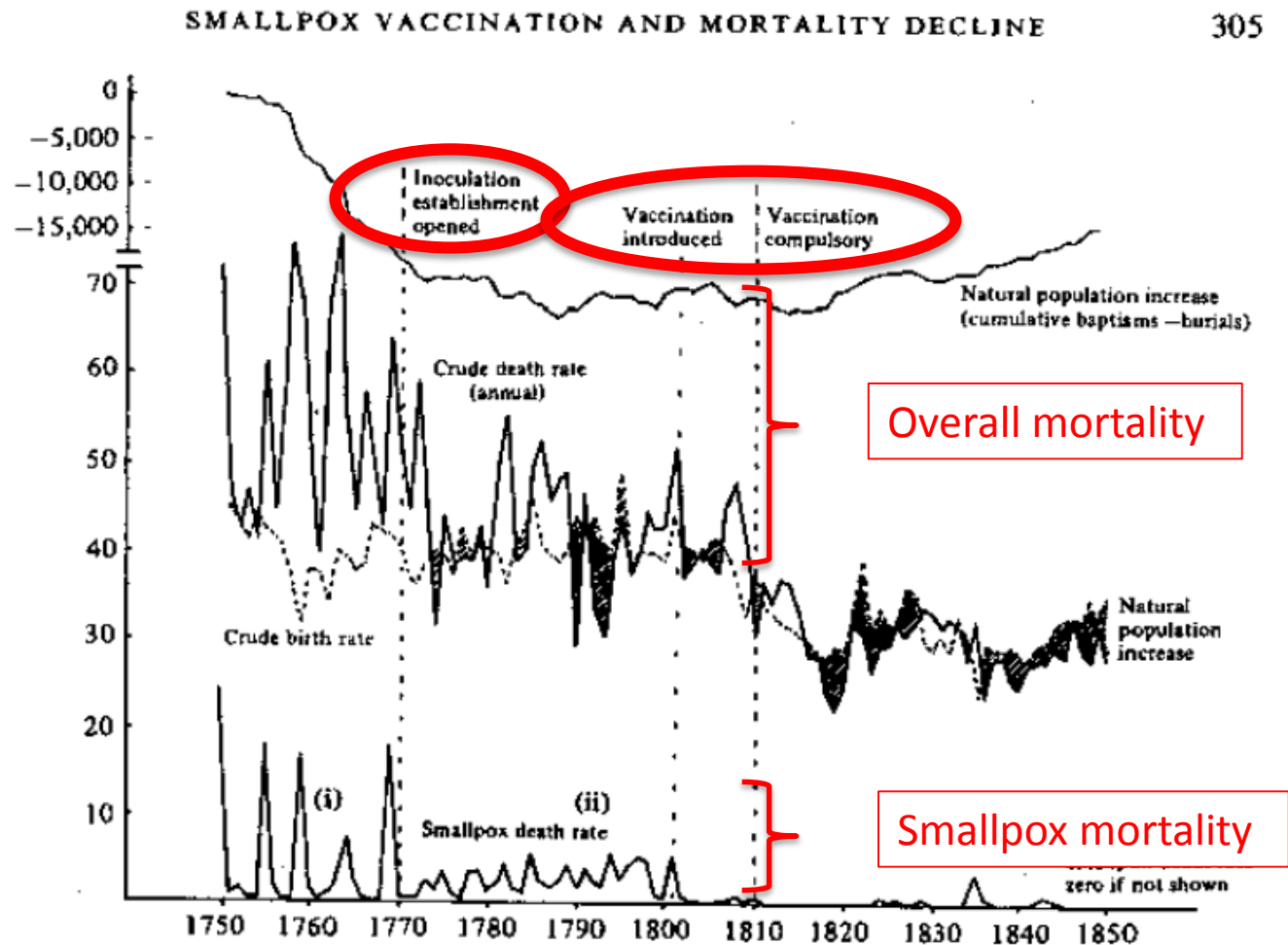
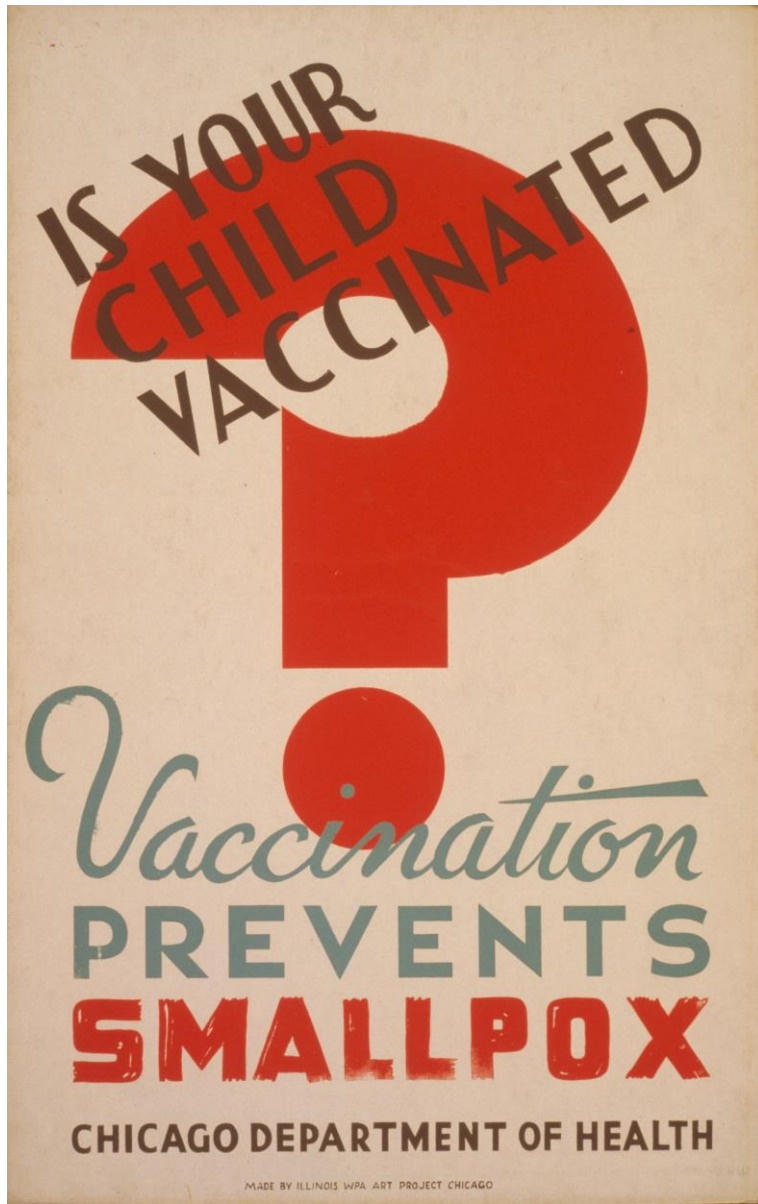


Figure 8. Smallpox death rate per 1,000 and crude birth and death rates per 1,000 for Copenhagen: 1750–1850, showing an index of natural population growth and periods of smallpox inoculation and vaccination use. Source: Data taken from *Royal Commission on Vaccination, 1889–96, First Report*, pp. 107–108.

Mercer A.J.  
Population  
studies, 1985

Smallpox vaccination campaigns eradicated smallpox  
And smallpox vaccine was stopped in 1980

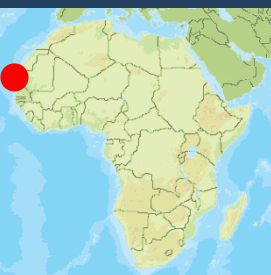




## Studies of smallpox vaccine in Africa

### Bandim Health Project *A platform for testing real-life effects of health interventions*

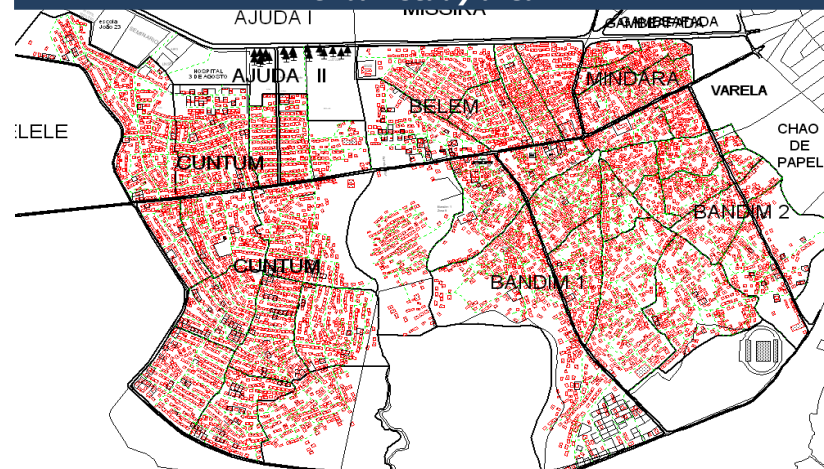
Guinea-Bissau



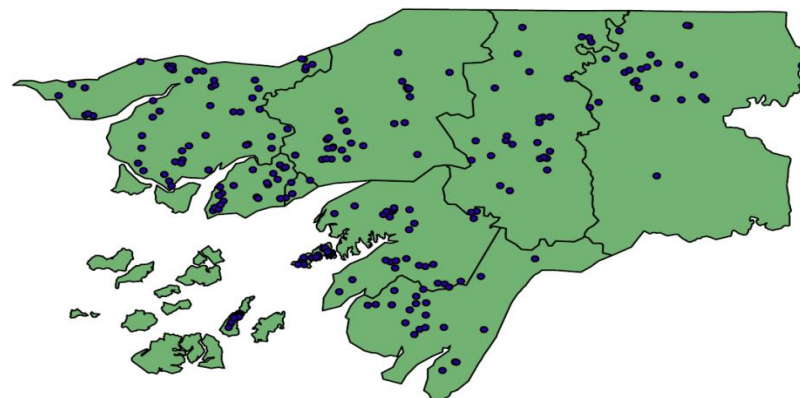
Bissau City



Urban study area



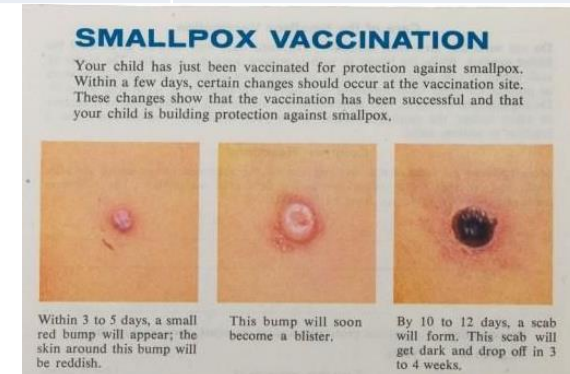
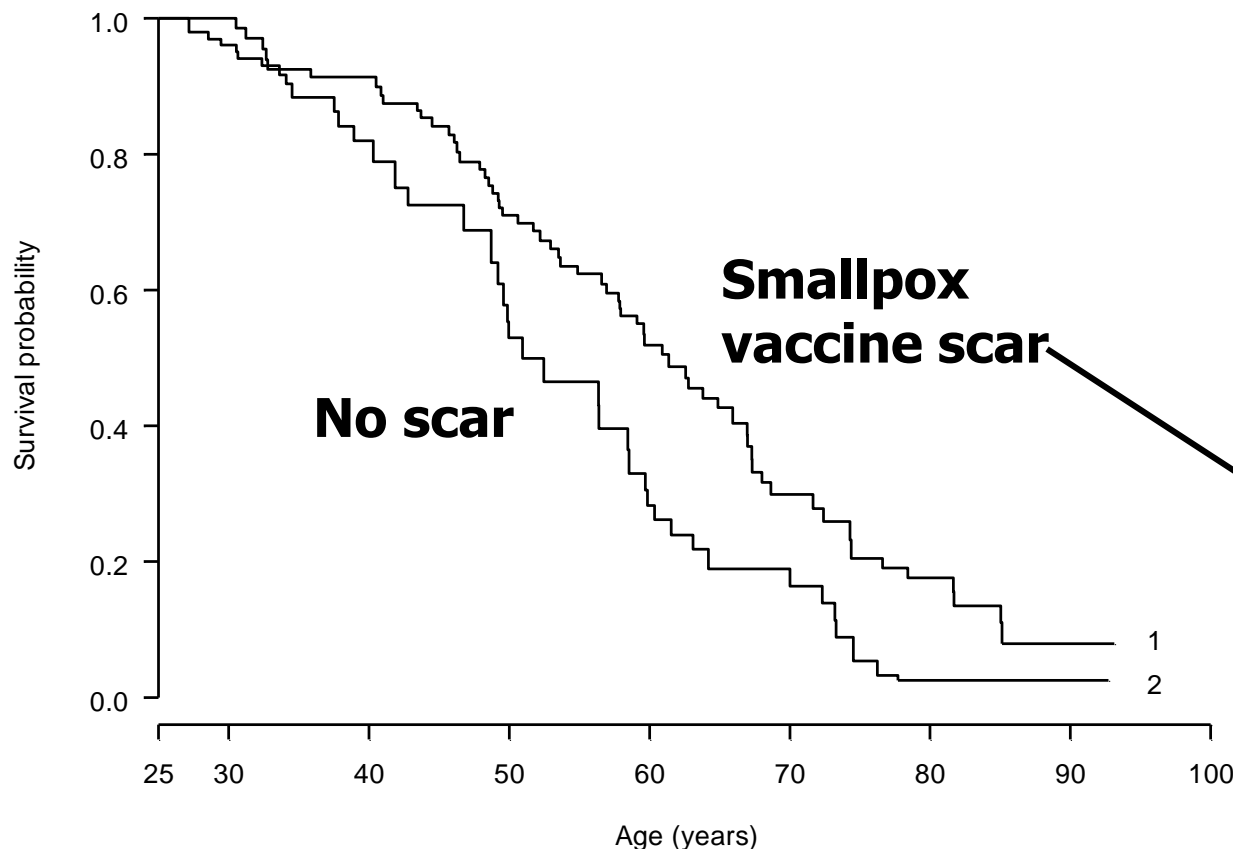
Rural study area



Urban study area > 100,000 persons  
Rural study area > 100,000 persons in 180 villages

# Improved survival among smallpox vaccinated in Guinea-Bissau

	Age group	Year	MRR all	MRR females	MRR males	Boosting
Urban area ( <i>Vaccine</i> 2006)	25 yrs+ (N=1893)	1998-2002	<b>0.60 (0.41–0.87)</b>	<b>0.51 (0.30–0.84)</b>	0.72 (0.42–1.24)	Each additional vaccinia scar: <b>0.73 (0.56–0.95)</b>
Rural area ( <i>PLoS ONE</i> 2006)	30 yrs+ (N=367)	2003-2006	<b>0.22 (0.08–0.61)</b>	<b>0.19 (0.06–0.57)</b>	0.40 (0.04–3.74)	Two or more scars: <b>0.14 (0.03–0.56)</b>

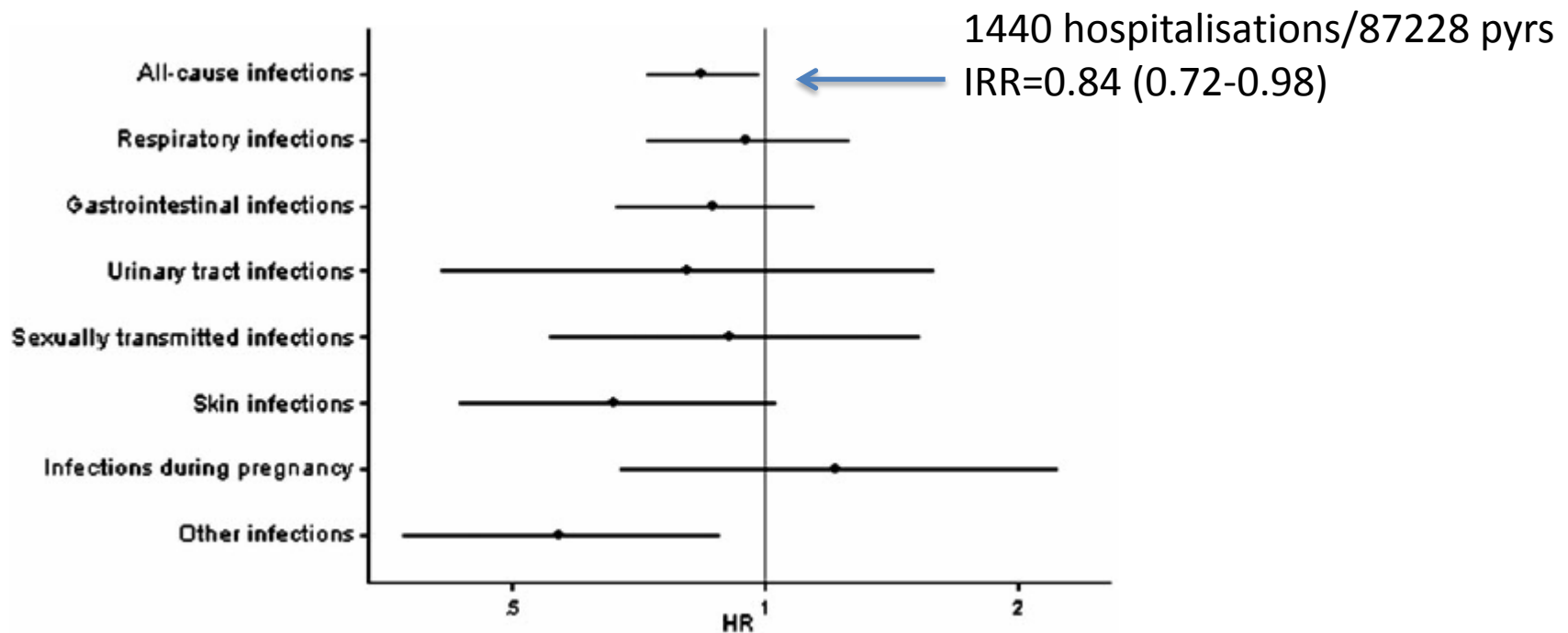


# Less infectious disease hospitalisations among smallpox vaccinated in Denmark

## Smallpox vaccination and all-cause infectious disease hospitalization: a Danish register-based cohort study

*Int J Epidemiol* 2011

Signe Sørup,<sup>1,2\*†</sup> Marie Villumsen,<sup>1,2\*†</sup> Henrik Ravn,<sup>1</sup> Christine Stabell Benn,<sup>1</sup>  
Thorkild I A Sørensen,<sup>2</sup> Peter Aaby,<sup>1,3</sup> Tine Jess<sup>2,4</sup> and Adam Roth<sup>3,5</sup>



## Protection against melanoma by vaccination with Bacille Calmette-Guérin (BCG) and/or vaccinia: an epidemiology-based hypothesis on the nature of a melanoma risk factor and its immunological control

Bernd Krone <sup>a,\*</sup>, Klaus F. Kölmel <sup>b</sup>, Beate M. Henz <sup>c</sup>, John M. Grange <sup>d</sup>

Table 1

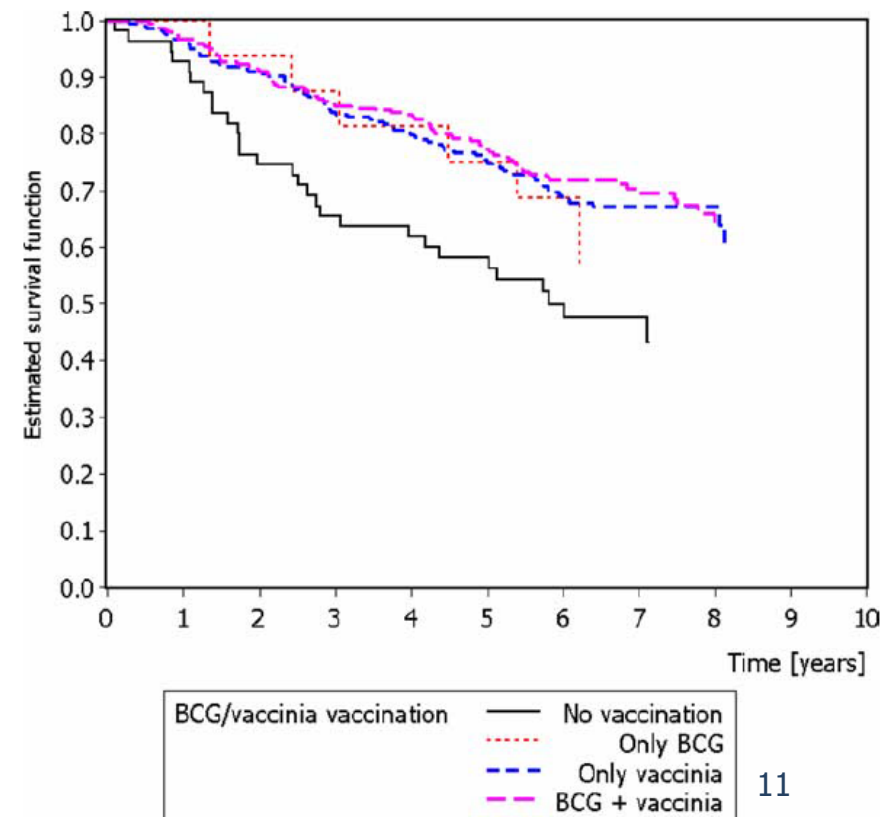
Summary of the FEBIM study on the effects of vaccinia and BCG vaccination on the risk of melanoma development [11]

Vaccinations	Number of cases/number of controls	Adjusted Odds Ratios <sup>*</sup>	95% Confidence Intervals
<i>Effect of vaccinations</i>			
No vaccinia, no BCG	63/37	1.0	Reference
Vaccinia and BCG	271/341	0.41	0.25–0.67
Only BCG	19/26	0.40	0.18–0.85
Only vaccinia	250/223	0.60	0.36–0.99

## Prior immunisation of patients with malignant melanoma with vaccinia or BCG is associated with better survival. An European Organization for Research and Treatment of Cancer cohort study on 542 patients

K.F. Kölmel <sup>a,\*</sup>, J.M. Grange <sup>b</sup>, B. Krone <sup>c</sup>, G. Mastrangelo <sup>d</sup>, C.R. Rossi <sup>e</sup>, B.M. Henz <sup>f</sup>,  
C. Seebacher <sup>g</sup>, I.N. Botev <sup>h</sup>, M. Niin <sup>i</sup>, D. Lambert <sup>j</sup>, R. Shafir <sup>k</sup>, E.-M. Kokoschka <sup>l</sup>,  
U.R. Kleeberg <sup>m</sup>, O. Gefeller <sup>n</sup>, A. Pfahlberg <sup>l</sup>

Survival once ill:  
Vaccinia and BCG: 0.41 (0.25-0.69)



**Deduction: *"Smallpox vaccine associated with reduced risk of infectious diseases (incl. HIV1) and improved survival"***

## **Causal relationship?**

- Association seen both in Guinea-Bissau (urban/rural) and in Denmark ("Nat. exp.")
- After adjustment for various socioeconomic factors
- Sex-differences in associations in Guinea-Bissau and for HIV-1 in Guinea-Bissau and Denmark
- No associations with accidents hospitalisations and deaths in Denmark
- Stronger associations with increasing number of vaccines
- Biological mechanisms

RESEARCH ARTICLE

Open Access

## Significantly reduced CCR5-tropic HIV-1 replication *in vitro* in cells from subjects previously immunized with Vaccinia Virus

JOURNAL OF VIROLOGY, Nov. 2007, p. 12458–12464  
0022-538X/07/\$08.00+0 doi:10.1128/JVI.00326-07

Vol. 81, No.

Raymond S Weinstein\*<sup>1</sup>, Michael M Weinstein<sup>2</sup>, Kenne

*Immunopharmacology and Immunotoxicology*, 2011, 1–10, Early Online  
© 2011 Informa Healthcare USA, Inc.  
ISSN 0892-3973 print/ISSN 1532-2513 online  
DOI: 10.3109/08923973.2011.596542

## Interactions between Human Immunodeficiency Virus Type 1 and Vaccinia Virus in Human Lymphoid Tissue Ex Vivo<sup>▽</sup>

Christophe Vanpouille,<sup>1,2\*</sup> Angélique Biancotto,<sup>1</sup> Andrea Lisco,<sup>1</sup> and Beda Brichacek<sup>1,2</sup>

Laboratory of Molecular and Cellular Biophysics, National Institute of Child Health and Human Development, Bethesda, Maryland 20892,<sup>1</sup> and The George Washington University Medical Center, Washington, DC 20037<sup>2</sup>

RESEARCH ARTICLE

Vaccinia and other viruses with available vaccines show marked homology with the HIV-1 envelope glycoprotein: The prospect of using existing vaccines to stem the AIDS pandemic

C.J.Chris Carter



## LETTER

doi:10.1038/nature10851

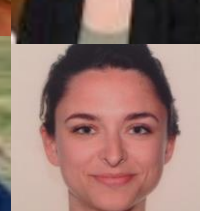
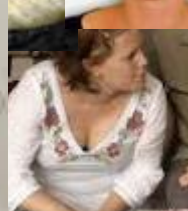
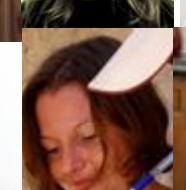
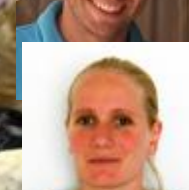
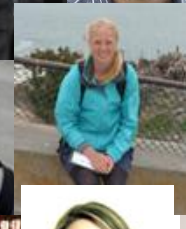
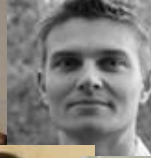
### Skin infection generates non-migratory memory CD8<sup>+</sup> T<sub>RM</sub> cells providing global skin immunity

Xiaodong Jiang<sup>1</sup>, Rachael A. Clark<sup>1</sup>, Luzheng Liu<sup>1</sup>, Amy J. Wagers<sup>2</sup>, Robert C. Fuhlbrigge<sup>1</sup> & Thomas S. Kupper<sup>1</sup>

been proposed<sup>1–5</sup>. Here we show in mice that localized vaccinia virus (VACV) skin infection generates long-lived non-recirculating CD8<sup>+</sup> skin T<sub>RM</sub> cells that reside within the entire skin. These skin T<sub>RM</sub> cells are potent effector cells, and are superior to circulating central memory T (T<sub>CM</sub>) cells at providing rapid long-term protection against cutaneous re-infection. We find that CD8<sup>+</sup> T cells



# Bandim Health Project and Research Center for Vitamins and Vaccines (CVIVA)



Thank you for your attention ☺

