

## Curriculum vitae

### Peter Aaby, DMSc

Jacob Erlandsensgade 9, 2100 Copenhagen Ø, Denmark; Phone: 45 6054 3964

#### Education

1974 Mag. Scient, Social Anthropology, University of Copenhagen  
1988 DMSc, University of Copenhagen

#### Positions and Employment

1968-1991 Institute of Anthropology, University of Copenhagen  
1978-1981 Associated with SAREC, Sweden.  
1987-1991 Associated with Danish Church Aid  
1991-2020 Statens Serum Institut; Research Professor DANIDA/SSVF (1995-2001); Novo Nordisk Foundation professorship grant (2002-2014)  
2021- Professor, University of Southern Denmark

#### Honours

2000 Novo Nordisk prize for "Ground-breaking epidemiological research especially with regard to vaccinations against measles infection"  
2009 Ministry of Foreign Affairs: 5th most important Dane for fighting global poverty  
2009 + 2011+ 2014: Nominated as one of 10 best Danish research results of the year; two 2<sup>nd</sup> prizes  
2012-2022 Adjunct Professor, University of Southern Denmark  
2012-2018 Co-organiser of Research Center for vitamins and vaccines (CVIVA), center of excellence sponsored by the DNRF (Centre leader: Christine S Benn)  
2015 Doctor Honoris Causa, Universidade Nova de Lisboa  
2017 SEB Pensions Hæderpris  
2019 Research into non-specific effects featured in Scientific American: Vaccines Reimagined (June, 54-61)  
2020 Member of *Academia Europaea*  
2020 Nature published "[Milestones in Vaccines](https://www.nature.com/immersive/d42859-020-00005-8/index.html)" which gave Peter Aaby recognition for the discovery of beneficial non-specific effects of vaccines (Milestone 13).  
<https://www.nature.com/immersive/d42859-020-00005-8/index.html>

#### Research training

Primary supervision in West Africa: 11 researchers have obtained a doctoral degree, 36 have obtained a PhD degree. The first PhD from Guinea-Bissau, Amabelia Rodrigues became the first director of the National Institute of Health, Guinea-Bissau. Kåre Mølbak became the state epidemiologist of Denmark. Christine S Benn has become the first Danish physician to receive an ERC starting grant and has received a Danish National Research Foundation Centre of Excellence grant. Many previous students are professors or senior registrars.

#### Scientific Focus

Since 1978 PA have built a large health and demographic surveillance system in Guinea-Bissau; under-5 child mortality was 500/1000 when we started. Contrary to all expectations, the high measles case fatality (25%) was not due to malnutrition, but to the intensity of exposure. Intensity of exposure was subsequently

shown to explain severity in many childhood infections including pertussis, chickenpox, polio and RSV. Our group was the first to introduce measles vaccine (MV) in Bissau in 1979. The MV campaign reduced overall child mortality by two-thirds, an effect not explained by prevention of measles infection. This led to a series of discoveries contradicting the specific-disease paradigm. Vaccines affect susceptibility to unrelated infections and these non-specific effects (NSEs) are far more important for child survival than the specific protective effects of the target vaccines: Live vaccines, including measles vaccine, BCG, OPV and smallpox vaccination, have major beneficial NSEs, whereas non-live vaccines, including DTP, IPV, HBV, Pentavalent and RTS,S malaria vaccine have negative effects for female survival. Under-5 mortality has now declined to 65/1000; the numerous eradication campaigns with OPV and MV are responsible for much of this decline.

A new paradigm emphasizing the immune system as a learning entity which can be trained to increase resistance or misdirected to enhance susceptibility to unrelated infections is needed. Pursuing this paradigm can lead to major reductions in child mortality in low-income countries and to health care cost-savings in rich countries.

### **Publications**

PA has **725 papers** in the medical field; H-index: 93 (Google Scholar): i10: 509; 32,947 citations.

### **Key publications referred to in the nomination letter**

1. **Aaby P**, Bukh J, Lisse IM, Smits AJ. Measles vaccination and child mortality. *Lancet* 1981; ii:93.
2. **Aaby P**, Bukh J, Lisse IM, Smits AJ. Measles mortality, state of nutrition, and family structure: A community study from Guinea-Bissau. *J Infect Dis* 1983; 147:693-701
3. **Aaby P**, Bukh J, Lisse IM, Smits AJ. Overcrowding and intensive exposure as determinants of measles mortality. *Am J Epidemiol* 1984; 120:49-63
4. **Aaby P**, Bukh J, Lisse IM, Smits AJ. Measles vaccination and reduction in child mortality: a community study from Guinea-Bissau. *J Infect* 1984; 8:13-21
5. **Aaby P**, Bukh J, Lisse IM, Smits AJ. Severe measles in Sunderland, 1885: A European-African comparison of causes of severe infection. *Int J Epidemiol* 1986; 15:101-7
6. **Aaby P**. Severe measles in Copenhagen, 1915-1925. *Rev Infect Dis* 1988;10:452-456
7. Garenne M, **Aaby P**. Pattern of exposure and measles mortality in Senegal. *J Inf Dis* 1990;161:1088-1094
8. **Aaby P**. Patterns of exposure and severity of measles infection. Copenhagen 1915-1925. *Ann Epidemiol* 1992; 2:257-262
9. **Aaby P**, Oesterle H, Dietz K, Becker N. Case-fatality rates in severe measles outbreak in rural Germany in 1861. *Lancet* 1992; 340:1172
10. **Aaby P**, Knudsen K, Whittle H, Lisse IM, Thårup J, Poulsen A, Sodemann M, Jakobsen M, Brink L, Gansted U, Permin A, Jensen TG, Andersen H, da Silva MC. Long-term survival after Edmonston-Zagreb measles vaccination in Guinea-Bissau: Increased female mortality rate. *J Pediatr* 1993;122:904-8
11. **Aaby P**, Samb B, Simondon F, Knudsen K, Coll Seck AM, Bennett J, Markowitz L, Rhodes P, Whittle H. Sex-specific differences in mortality after high titre measles immunization in rural Senegal. *Bull WHO* 1994;72:761-770
12. **Aaby P**, Samb B, Simondon F, Coll Seck AM, Knudsen K, Whittle H. Non-specific beneficial effect of measles immunisation: analysis of mortality studies from developing countries. *Br Med J* 1995;311:481-485
13. Knudsen KM, **Aaby P**, Whittle H, Rowe M, Samb B, Simondon F, Sterne J, Fine P. Child mortality following standard, medium or high titre measles immunization in West Africa. *Int J Epidemiol* 1996;25:665-73
14. Morley DC, **Aaby P**. Managing measles: Size of infecting dose may be important. *Br Med J* 1997;314:1692
15. Kristensen I, **Aaby P**, Jensen H. Routine vaccinations and child survival: follow up study in Guinea-

- Bissau, West Africa. *Br Med J* 2000;321:1435-8
16. Nielsen NM, **Aaby P**, Wohlfahrt J, Pedersen JB, Melbye M, Mølbak K. Intensive exposure as a risk factor for severe polio: A study of multiple family cases. *Scan J Inf Dis* 2001;33:301-5
  17. **Aaby P**, Jensen H. Routine vaccination and child survival in Guinea-Bissau. Authors' reply to Commentary. *BMJ* 2001;322:360
  18. Nielsen NM, Hedegaard K, **Aaby P**. Intensity of exposure and severity of whooping cough. *J Infect* 2001;43:177-81
  19. Poulsen A, Quereshi K, Lisse I, Kofoed PE, Nielsen J, Vestergaard BF, **Aaby P**: A household study of chickenpox in Guinea-Bissau: Intensity of exposure is a determinant of severity. *J Infection* 2002;45:237-42
  20. **Aaby P**, Bhuyia A, Nahar L, Knudsen K, Francisco A, Strong M. The survival benefit of measles immunisation may not be explained entirely by the prevention of measles disease. *Int J Epidemiol* 2003;32: 106-115
  21. **Aaby P**, Jensen H, Samb B, Cisse B, Sodeman M, Jakobsen M, Poulsen A, Rodrigues A, Lisse IM, Simondon F, Whittle H. Differences in female-male mortality after high-titre measles vaccine and association with subsequent vaccination with diphtheria-tetanus-pertussis and inactivated poliovirus: reanalysis of West African studies. *Lancet* 2003;361: 2183-88
  22. **Aaby P**, Rodrigues A, Biai S, Martins C, Veirum JE, Benn CS, Jensen H. Oral polio vaccination and low case fatality at the paediatric ward in Bissau, Guinea-Bissau. *Vaccine* 2004;22:3014-7
  23. Garly ML, Jensen H, Martins CL, Balé C, Balde MA, Lisse IM, **Aaby P** Hepatitis B vaccination associated with higher female than male mortality in Guinea-Bissau: an observational study. *Pediatr Infect Dis J* 2004;23:1086-92
  24. **Aaby P**, Garly ML, Jensen H, Martins C, Balé C, Benn CS, Rodrigues A, Lisse IM. Increased female-male mortality ratio associated with inactivated polio and diphtheria-tetanus-pertussis vaccines: Observations from vaccination trials in Guinea-Bissau. *Pediatr Infect Dis J* 2007;26:247-52.
  25. **Aaby P**, Roth A, Ravn H, Napirna BM, Rodrigues A, Lisse IM, Stensballe L, Diness BR, Lausch KR, Lund N, Biering-Sørensen S, Whittle H, Benn CS. Randomised trial of BCG vaccination at birth to low-birth-weight children: Beneficial non-specific effects in the neonatal period? *JID* 2011;204:245-52
  26. **Aaby P**, Benn CS, Nielsen J, Lisse IM, Rodrigues A, Ravn H. Testing the hypothesis that diphtheria-tetanus-pertussis vaccine has negative non-specific and sex-differential effects on child survival in high-mortality countries. *BMJ Open* 2012;2:e000707.
  27. Lund N, Andersen A, Hansen AS, Jepsen FS, Barbosa AG, Biering-Sørensen S, Ravn H, **Aaby P**, Benn CS. The Effect of Oral Polio Vaccine at Birth on Mortality. A Randomized Trial. *Clin Infect Dis*. 2015 Nov 15;61(10):1504-11. doi: 10.1093/cid/civ617. Epub 2015 Jul 28.
  28. Klein SL, Shann F, Moss WJ, Benn CS, **Aaby P**. RTS,S malaria vaccine and increased mortality in girls. *mBio* 7(2):e00514-16. doi:10.1128/mBio.00514-16. (PR)(CO)(OA)
  29. Rieckmann A, Villumsen M, Sørup S, Hugaard LK, Ravn H, Roth A, Baker JL, Benn CS, **Aaby P**. Vaccinations against smallpox and tuberculosis are associated with better long-term survival: a Danish case-cohort study 1971- 2010. *Int J Epidemiol* 2017;46:695-705
  30. **Aaby P**, Ravn H, Benn CS. The WHO Review of the Possible Nonspecific Effects of Diphtheria-Tetanus-Pertussis Vaccine. *Pediatr Infect Dis J*. 2016 Nov;35(11):1247-1257
  31. Benn CS, Jacobsen LH, Fisker AB, Rodrigues A, Sartono E, Lund N, Whittle HC, **Aaby P**. Campaigns with oral polio vaccine may lower mortality and create unexpected results. *Vaccine* 2017;35:1113-1116.
  32. Byberg S, Thysen SM, Rodrigues A, Martins C, Cabral C, Careme M, **Aaby P**, Benn CS, Fisker AB. A general measles vaccination campaign in urban Guinea-Bissau: Comparing child mortality among participants and non-participants. *Vaccine*. 2017 Jan 3;35(1):33-39. doi: 10.1016/j.vaccine.2016.11.049. Epub 2016 Nov 24.
  33. Welaga P, Oduro A, Debpuur C, **Aaby P**, Ravn H, Andersen A, Binka F, Hodgson A. Fewer out-of-sequence vaccinations and reduction of child mortality in Northern Ghana. *Vaccine*. 2017 Apr 25;35(18):2496-2503. doi: 10.1016/j.vaccine.2017.03.004. Epub 2017 Mar 22.
  34. Biering-Sørensen S, **Aaby P**, Lund N, Monteiro I, Jensen K, Eriksen HB, Scholtz-Buchholzer F, Jørgensen ASP, Rodrigues A, Fisker AB, Benn CB. Early BCG and neonatal mortality among low-birth-weight infants: A randomised controlled trial. *CID* 2017;65:1183-90

35. Arts RJW, Moorlag SJCFM, Novakovic B, Li Y, Wang SY, Oosting M, Kumar V, Xavier RJ, Wijmenga C, Joosten LAB, Reusken CBEM, Benn CS, **Aaby P**, Koopmans MP, Stunnenberg HG, van Crevel R, Netea MG. BCG Vaccination Protects against Experimental Viral Infection in Humans through the Induction of Cytokines Associated with Trained Immunity. *Cell Host Microbe* 2018;23(1):89-100.e5.
36. Andersen A, Fisker AB, Rodrigues A, Martins C, Ravn H, Lund N, Biering-Sørensen S, Benn CS, **Aaby P**. National Immunization Campaigns with Oral Polio Vaccine Reduce All-Cause Mortality: A Natural Experiment within Seven Randomized Trials. *Front Public Health*. 2018;6:13
37. Schoeps A, Nebié E, Fisker AB, Sié A, Zakane A; Müller O, **Aaby P**, BecherH. No effect of an additional early dose of measles vaccine on hospitalization or mortality in children: a randomized controlled trial. *Vaccine* 2018;36:1965-71
38. **Aaby P**, Benn CS. Stopping live vaccines after disease eradication may increase mortality. *Vaccine* 2020;38:10-14
39. **Aaby P**, Fisker AB, Björkman, Benn CS. Rolling out the RTS,S malaria vaccine: To test or not to test the effect on mortality? *BMJ* 2020;l6920
40. Benn CS, Fisker AB, Rieckmann A, Sørup S, **Aaby P**. Vaccinology: Time to change paradigm? *Lancet Inf Dis* 2020
41. Brook B, Harbeson DJ, Shannon CP, Ben-Othman R, Cai B, He D, Francis F, Huang J, Varankovich N, Liu A, Bao W, Bjerregaard-Andersen M, Schaltz-Buchholzer F, Sanca L, Golding CN, Larsen KL, Levy O, Kampmann B, The EPIC Consortum, Wynn JL, Shann F, **Aaby P**, Benn CS, Tebbutt S, Amenyogbe N, Kollmann TR: BCG-vaccination induced emergency granulopoiesis provides rapid protection from neonatal sepsis. *Science Translational Medicine* 2020
42. **Aaby P**, Benn CS, Flanagan K, Klein S, Kollmann T, Lynn D, Shann F. The non-specific and sex-differential effects of vaccines. *Nat Rev Immunol* 2020;20:464-70
43. Moorlag SJCFM, van Deuren RC, ven Werkhoven CH, Jaeger M, Debisarun P, Taks E, Mourits VP, Koeken VACM, de Bree LCJ, ten Doesschate T, Cleophas MC, Smeekens S, Oosting M, van de Veerdonk FL, Joosten LAB, ten Oever J, van der Meer JWM, Curtis N, **Aaby P**, Benn CS, Giarmarellos-Bourboulis EJ, Bonten M, van Crevel R, Netea MG. Safety and COVID-19 symptoms in individuals recently vaccinated with BCG: a retrospective cohort study. *Cell Reports Medicine* 2020;1:100073
44. Madsen AMR, **et al**. Using BCG vaccine to enhance non-specific protection of health cre workers during the COVID-19 pandemic: A structures summary of a study protocoal for a randomised in Denmark. *Trials* 2020.
45. Andersen A\*, Fisker AB\*, Rodrigues A, Martins C, Ravn H, Lund N, Biering-Sørensen S, Benn CS, **Aaby P**. National immunisation campaigns with oral polio vaccine may reduce all-cause mortality: An analysis of 13 years' of demographic surveillance data from an urban African area. *Clin Infect Dis* 2020

### The most recent publications - from 2019 and onwards

#### 2019

46. Sørup S, Jensen AKG, **Aaby P**, Benn CS. Revaccination with measles-mumps-rubella vaccine and infectious disease morbidity: a Danish register-based cohort study. *CID* 2019;68:282-90
47. F Schaltz-Buchholzer, S Biering-Sørensen, N Lund, I Monteiro, P Umbasse, A B Fisker, A Andersen, A Rodrigues, **P Aaby**, C S Benn; Early Bacille Calmette-Guérin vaccination, hospitalizations and hospital deaths: Analysis of a secondary outcome in three randomized trials from Guinea-Bissau, *The Journal of Infectious Diseases* 2019;219:624-32
48. Blok B, Jensen KJ, **Aaby P**, Fomsgaard A, van Crevel R, Benn CS, Netea M. Opposite effects of Vaccinia and Modified Vaccinia Ankara on trained immunity. *European Journal of Clinical Microbiology & Infectious Diseases* 2019;38:449-56
49. Walk J, de Bree C, Graumans W, Siebelink-Stoter R, van Gemert GJ, van de Vegte-Bolmer M, Teelen K, Hermsen CC, Arts RJW, Behet MJ, Moorlag S, Yang ASP, van Crevel R, **Aaby P**, de Mast Q, van der Ven AJMA, Benn CS, Netea MG, Sauerwein RW. BCG vaccination induces trained immunity to a controlled human malaria infection. *Nature Comm* 2019;10:874
50. Berendsen M, Øland CB, Bles P, Jensen AKG, Kofoed PE, Whittle H, de Bree C, Netea MG<sup>6</sup>, Martins C, Benn CS, **Aaby P**. Maternal priming: BCG-scarring in the mother enhances the survival of children with a BCG-scar. *JPIDS* 2019;piy142

51. Jensen MM, Olesen JS, Kjerulff B, Byberg S, da Silva ZJ, Rodrigues A, Jespersen S, Wejse C, **Aaby P**, Erikstrup C, Hønge B. HTLV prevalence is no longer following the decreasing HIV prevalence - 20 years of retroviral surveillance in Guinea-Bissau, West Africa. *Acta Trop*. 2019;192:144-50
52. Benn CS, **Aaby P**, Fisker AB. Lessons learned from the testing of neonatal vitamin A supplementation. *Nutrients* 2019;11:pii:E449
53. Blok B, de Bree LCJ, Diavatopoulos DA, Langereis JD, Joosten LAB, **Aaby P**, van Cleve R, Benn CS, Netea M. Interacting non-specific immunological effects of BCG and Tdapf vaccinations: An explorative randomized trial. *Clin Infect Dis* 2019;ciz246
54. Rieckmann A, Haerskjold A, Benn CS, **Aaby P**, Lange T, Sorup S. Measles, mumps and rubella vs diphtheria–tetanus–acellular-pertussis–inactivated-polio–Haemophilus influenzae type b as the most recent vaccine and risk of early ‘childhood asthma’. *Int J Epidemiol*. 2019
55. Bjerregaard-Andersen M, Gomes GM, Hennild DE, Jensen DM, Christensen K, Sodemann M, Beck-Nielsen H, **Aaby P**. The Guinea-Bissau Twin Registry Update: A Platform for Studying Twin Mortality and Metabolic Disease. *Twin Res Hum Genet*. 2019 Jul 18:1-7. doi: 10.1017/thg.2019.39.
56. Thyssen SM, Fernandes M, Benn CS, **Aaby P**, Fisker AB. Cohort profile: Bandim Health Project's (BHP) rural Health and Demographic Surveillance System (HDSS)-a nationally representative HDSS in Guinea-Bissau. *BMJ Open*. 2019 Jun 11;9(6):e028775
57. Thyssen **et al**. Can earlier BCG vaccination reduce early infant mortality? Study protocol for a cluster randomised trial in Guinea-Bissau. *BMJ Open* 2019;9
58. Thyssen SM, Rodrigues A, **Aaby P**, Fisker AB. Out-of-sequence DTP and measles vaccinations and child mortality in Guinea-Bissau – a reanalysis. *BMJ Open* 2019;9:e24893
59. Jensen KJ, Biering-Sørensen S, Ursing J, Kofoed PE, **Aaby P**, Benn CS (2019) Seasonal variation in the non-specific effects of BCG vaccination on neonatal mortality: three randomized controlled trials in Guinea-Bissau. *BMJ Global Health* 2019.
60. Andreas Rieckmann, Kathrine Damm Meyle, Naja Hulvej Rod, Jennifer Lyn Baker, Christine Stabell Benn, **Peter Aaby**, Signe Sørup “Smallpox and BCG vaccination in childhood and cutaneous malignant melanoma in Danish adults followed from 18 to 49 years” *Vaccine*
61. Toy T, **et al**. Multicountry Distribution and Characterization of Extended-spectrum  $\beta$ -Lactamase-associated Gram-negative Bacteria From Bloodstream Infections in Sub-Saharan Africa. *CID* 2019
62. **Aaby P**, Benn CS. Developing the concept of beneficial nonspecific effect of live vaccines with epidemiological studies. *Clin Microbiol Infect*. 2019 Aug 23. pii: S1198-743X(19)30452-5.
63. Rieckmann **et al**. Hypothesis: Termination of smallpox vaccination and increase in the female/male HIV-1 prevalence ratio. *BMJ Open*
64. Berendsen ML, van Gijzel SW, Smits J, de Mast Q, **Aaby P**, Benn CS, Netea MG, van der Ven AJ. BCG vaccination is associated with reduced malaria prevalence in children under the age of 5 years in sub-Saharan Africa. *BMJ Glob Health*. 2019 Nov 14;4(6):e001862. doi: 10.1136/bmjgh-2019-001862. eCollection 2019.
65. Schaltz-Buchholzer F, Bjerregaard-Andersen M, Øland CB, Golding C, Stjernholm EB, Monteiro I, **Aaby P**, Benn CS. Early vaccination with BCG-Denmark or BCG-Japan versus BCG-Russia to healthy newborns in Guinea-Bissau: A randomized controlled trial. *Clin Infect Dis*. 2019 Nov 3. pii: ciz1080. doi: 10.1093/cid/ciz1080. [Epub ahead of print] PubMed PMID: 31677386.
66. Varma A, Jensen AKG, Thyssen SM, Pedersen LM, **Aaby P**, Fisker AB. Research protocol of two concurrent cluster-randomized trials: Real-life Effect of a CAMPAign with Measles Vaccination (RECAMP-MV) and Real-life Effect of a CAMPAign with Oral Polio Vaccination (RECAMP-OPV) on mortality and morbidity among children in rural Guinea-Bissau. *BMC Public Health*. 2019 Nov 11;19(1):1506.
67. Madsen T, Jespersen S, Medina C, Té DDS, Wejse C, Laursen AL, Hønge BL; **Bissau HIV Cohort Study** Group. Acceptance and Feasibility of Partner Notification to HIV Infected Individuals. *AIDS Behav*. 2019 Nov 8. doi: 10.1007/s10461-019-02717-z
68. Hansen NS, Byberg S, Jacobsen LH, Bjerregaard-Andersen M, Jensen AKG, Martins C, **Aaby P**, Jensen JS, Benn CS, Whittle H. Correction: Effect of early measles vaccine on pneumococcal colonization: A randomized trial from Guinea-Bissau. *PLoS One*. 2019 Oct 30;14(10):e0224782.
69. Lise Gehrt, **Peter Aaby**, Christine Stabell Benn and Signe Sørup. Regarding “Early childhood vaccination and subsequent mortality or morbidity: are observational studies hampered by residual confounding? A Danish register-based cohort study”. *BMJ Rapid Responses*, 30 October 2019
70. Hønge BL, Olesen JS, Jensen MM, Jespersen S, da Silva ZJ, Rodrigues A, Laursen AL, Wejse C, Krarup H, **Aaby P**, Erikstrup C. Hepatitis B and C in the adult population of Bissau, Guinea-Bissau: a cross-sectional survey. *Trop Med Int Health*. 2019 Nov 20
71. Lise Gehrt, **Peter Aaby**, Christine Stabell Benn and Signe Sørup. Response to comment regarding “Early childhood vaccination and subsequent mortality or morbidity: are observational studies hampered by residual confounding? A Danish register-based cohort study”. *BMJ Rapid Responses*, 12 December 2019

**2020**

72. **Aaby P**, Benn CS. Stopping live vaccines after disease eradication may increase mortality. *Vaccine* 2020;38:10-14
73. **Aaby P**, Fisker AB, Björkman, Benn CS. Rolling out the RTS,S malaria vaccine: To test or not to test the effect on mortality? *BMJ* 2020;l6920
74. Benn CS, Fisker AB, Rieckmann A, Sørup S, **Aaby P**. Vaccinology: Time to change paradigm? *Lancet Inf Dis* 2020
75. Clipet-Jensen C, Andersen A, Jensen AKG, **Aaby P**, Zaman K. Out-of-sequence measles and DTP vaccinations. A re-analysis of demographic surveillance data from rural Bangladesh. *CID* 2020
76. Jensen KJ, Biering-Sørensen S, Ursing J, Kofoed PL, **Aaby P**, Benn CS. Seasonal variation in the non-specific effects of BCG vaccination on neonatal mortality: three randomised controlled trials in Guinea-Bissau. *BMJ Glob Health*. 2020 Mar 5;5(3):e001873. doi: 10.1136/bmjgh-2019-001873. eCollection 2020.
77. Benn CS, Martins CL, Andersen A, Fisker AB, Whittle HC, **Aaby P**. Measles vaccination in the presence of measles antibody may enhance child survival. *Front Pediatr* 2020;8:article 20
78. Steiniche MM, Thysen SM, Jensen AKG, Rodrigues A, Martins C, Nyerowitsch DW, **Aaby P**, Fisker AB. . The effect of early measles vaccination on morbidity and growth: A randomised trial from Guinea-Bissau. *Vaccine* 2020;38:2487-94
79. Mutua MK, Mohamed SF, Limani-Murange EW, Kiarie L, Janusz CB, **Aaby P**, Fisker AB, Echoka E, Ravn H. Complete and on-time routine childhood immunization: determinants and association with severe morbidity in urban informal settlements, Nairobi, Kenya. *Ann Hum Biology* 2020;47:132-41
80. Brook B, Harbeson DJ, Shannon CP, Ben-Othman R, Cai B, He D, Francis F, Huang J, Varankovich N, Liu A, Bao W, Bjerregaard-Andersen M, Schaltz-Buchholzer F, Sanca L, Golding CN, Larsen KL, Levy O, Kampmann B, The EPIC Consortium, Wynn JL, Shann F, **Aaby P**, Benn CS, Tebbutt S, Amenyogbe N, Kollmann TR: BCG-vaccination induced emergency granulopoiesis provides rapid protection from neonatal sepsis. *Science Translational Medicine* 2020
81. Blok BA, Arts RJW, van Crevel R, **Aaby P**, Joosten LAB, Benn CS, Netea MG. Differential effects of BCG vaccine on immune responses induced by vi polysaccharide typhoid fever vaccination: an explorative randomized trial. *Eur J Clin Micro Infect Dis* 2020;39:566-74
82. Gehrt L, **Aaby P**, Benn CS, Sørup S. "Response to comment regarding "Early childhood vaccination and subsequent mortality or morbidity: are observational studies hampered by residual confounding? A Danish register-based cohort study"". eLetter URL: <https://bmjopen.bmj.com/content/9/9/e029794>
83. Benn CS, Roth A, Garly ML, Fisker AB, Schaltz-Buchholzer F, Timmermann A, Berensen M, **Aaby P**. BCG-scarring and improved child survival: A combined analysis of studies of BCG-scarring. *J Int Med* 2020;joim.13084
84. Thysen SM, Benn CS, Gomes VF, Rudolf F, Wejse C, Roth A, Kallestrup P, **Aaby P**, Fisker A. Neonatal BCG vaccination and child survival in TB-exposed and TB-unexposed children: a prospective cohort study. *BMJ Open*. 2020 Feb 28;10:e035595. doi: 10.1136/bmjopen-2019-035595.
85. Chumakov K, Benn CS, **Aaby P**, Kottilli S, Gallo R. Can existing live vaccines prevent COVID-19? *Science* 2020;368:1187-88
86. Stensballe LG, Ravn H, Birk NM, Kjærgaard J, Nissen TN, Pihl GT, Thøstesen LM, Greisen G, Jeppesen DL, Kofoed PE, Pryds O, Sørup S, **Aaby P**, Benn CS. Corrigendum: BCG Vaccination at Birth and Rate of Hospitalization for Infection Until 15 Months of Age in Danish Children: A Randomized Clinical Multicenter Trial. *J Pediatric Infect Dis Soc*. 2020 Feb 28;9(1):106. doi: 10.1093/jpids/piaa003.
87. **Aaby P**, Benn CS, Flanagan K, Klein S, Kollmann T, Lynn D, Shann F. The non-specific and sex-differential effects of vaccines. *Nat Rev Immunol* 2020;20:464-70
88. Van Damme W, Dahake R, Delamou A, Ingelbeen B, Wouters E, Vanham G, van de Pas R, Dossou JP, Ir P, Abimbola S, van der Borgh S, Narayanan D, Bloom G, van Engelgern I, Ahmed MAA, Kiendrébéogo JA, Verdonck K, de Brouwere V, Bello K, Kloos H, **Aaby P**, Kalk A, Al-Awlaqi S, Prashanth NS, Muyembe-Tamfum JJ, Mbala P, Ahuka-Mundeke S, Assefa Y. The COVID-19 pandemic: diverse contexts; different epidemics – how and why? *BMJ Global Health* 2020;5:003098
89. Moorlag SJCFM, van Deuren RC, ven Werkhoven CH, Jaeger M, Debisarun P, Taks E, Mourits VP, Koeken VACM, de Bree LCJ, ten Doesschate T, Cleophas MC, Smeekens S, Oosting M, van de Veerdonk FL, Joosten LAB, ten Oever J, van der Meer JWM, Curtis N, **Aaby P**, Benn CS, Giarmarellos-Bourboulis EJ, Bonten M, van Crevel R, Netea MG. Safety and COVID-19 symptoms in individuals recently vaccinated with BCG: a retrospective cohort study. *Cell Reports Medicine* 2020;1:100073
90. Madsen AMR, **et al**. Using BCG vaccine to enhance non-specific protection of health care workers during the COVID-19 pandemic: A structures summary of a study protocol for a randomised in Denmark. *Trials* 2020
91. Andersen A\*, Fisker AB\*, Rodrigues A, Martins C, Ravn H, Lund N, Biering-Sørensen S, Benn CS, **Aaby P**. National immunisation campaigns with oral polio vaccine may reduce all-cause mortality: An analysis of 13 years' of demographic surveillance data from an urban African area. *CID* 2020

92. Schaltz-Buchholzer F, Berendsen M, Roth A, Jensen KJ, Bjerregaard-Andersen M, Sørensen MK, Monteiro I, **Aaby P**, Benn CB. BCG skin reactions by 2 months of age are associated with better survival in infancy: A prospective observational study. *BMJ Global Health* 2020;0:e002993. doi:10.1136/bmjgh-2020-002993
93. Hønge BL, Olesen JS, Jensen MM, Jespersen S, da Silva ZJ, Rodrigues A, Laursen AL, Wejse C, Krarup H, **Aaby P**, Erikstrup C. Hepatitis B and C in the adult population of Bissau, Guinea-Bissau: a cross-sectional survey. *Trop Med Int Health*. 2020;25:255-263
94. Gehrt L, Rieckmann A, Kiraly N, Jensen AKG, Aaby P, Benn CS, Sørup S. Timeliness of DTaP-IPV-Hib vaccination and development of atopic dermatitis between 4 months and 1 year of age - Register-based cohort study. *J Allergy Clin Immunol Pract*. 2020 Oct 2:S2213-2198(20)31002-3. doi: 10.1016/j.jaip.2020.09.024.
95. Hanifi SMA, Fisker AB, Welaga P, Rieckmann A, Jensen AG, Benn CS, Aaby P: Diphtheria-tetanus-pertussis (DTP) vaccine is associated with increased female-male mortality rate ratios. A meta-analysis of studies of DTP administered before and after measles vaccine. *J Infect Dis*. 2020 Oct 30;jiaa684. doi: 10.1093/infdis/jiaa684.
96. Park SE, Pham DT, Pak GD, Panzner U, Espinoza LMC, von Kalckreuth V, Im J, Mogeni OD, Schütt-Gerowitt H, Crump JA, Breiman RF, Adu-Sarkodie Y, Owusu-Dabo E, Rakotozandrindrainy R, Soura AB, Aseffa A, Gasmelseed N, Sooka A, Keddy KH, May J, **Aaby P**, Biggs HM, Hertz JT, Montgomery JM, Cosmas L, Olack B, Fields B, Sarpong N, Razafindrabe TJL, Raminosoa TM, Kabore LP, Sampo E, Teferi M, Yeshitela B, Tayeb MAE, Krumkamp M, Dekker DM, Jaeger A, Tall A, Niang A, Bjerregaard-Andersen M, Løfberg SV, Deerin JF, Park JK, Konings F, Van Puyvelde S, Ali M, Clemens JD, Dougan G, Baker S and Marks F. The genomic epidemiology of multi-drug resistant nontyphoidal *Salmonella* causing invasive disease in sub-Saharan Africa. bioRxiv preprint oi: <https://doi.org/10.1101/2020.12.11.422246>
97. Varma A, **Aaby P**, Thysen SM, Jensen AKG, Fisker AB. Reduction in Short-term Outpatient Consultations After a Campaign With Measles Vaccine in Children Aged 9-59 Months: Substudy Within a Cluster-Randomized Trial. *J Pediatric Infect Dis Soc*. 2020 Nov 10;9(5):535-543. doi: 10.1093/jpids/piaa091. PMID: 32897359
98. Schaltz -Buchholzer F, Bjerregaard-Andersen M, Øland CB, Golding C, Stjernholm EB, Monteiro I, **Aaby P**, Benn CS. Early Vaccination With Bacille Calmette-Guérin-Denmark or BCG-Japan Versus BCG-Russia to Healthy Newborns in Guinea-Bissau: A Randomized Controlled Trial. *Clin Infect Dis*. 2020 Nov 5;71(8):1883-1893. doi: 10.1093/cid/ciz1080.

## 2021

99. Divangahi M, **Aaby P**, Khader SA, Barreiro LB, Bekkering S, Chavakis T, van Crevel R, Curtis N, DiNardo AR, Dominguez-Andres J, Duivenwoorden J, Fanucchi S, Fayad Z, Fuchs E, Hamon M, Jeffrey KL, Khan N, Joosten LAB, Kaufmann E, Latz E, Matarese G, van der Meer JWM, Mhlanga M, Moorlag SJCFM, Mulder JWM, Naik S, Novakovic B, O'Neill L, Ochando J, Ozato K, Riksen NP, Sauerwein R, Sherwood ER, Schlitzer A, Schultze JI, Sieweke MH, Benn CS, Stunnenberg H, Sun J, van de Veerdonk FL, Weis S, Williams DL, Xavier R and Netea MG. Trained immunity, tolerance, priming and differentiation: distinct immunological processes. *Nat Immunol*. 2021 Jan;22(1):2-6. doi: 10.1038/s41590-020-00845-6.
100. **Aaby P**, Benn CS. BCG: New life for a centenarian vaccine. *Lancet Infect Dis* 2021
101. Chumakov K, Jamison DT, **Aaby P**, Benn CS, Gallo RC. Letter to the Editor. *Risk Anal* 2021; 41(2): 387-8.
102. Engell-Sorensen T, Rieckmann A, Medina C, et al. Life expectancy of HIV-infected patients followed at the largest hospital in Guinea-Bissau is one-fourth of life expectancy of the background population. *Infection* 2021.
103. Galjour J, Havik P, Aaby P, Rodrigues A, Mpinga EK. Chronic Political Instability and the HIV/AIDS Response in Guinea-Bissau from 2000 to 2015: A Systematic Review. *Trop Med Infect Dis* 2021; 6(1).
104. Hanifi SMA, Biering-Sorensen S, Jensen AKG, **Aaby P**, Bhuiya A. Penta is associated with an increased female-male mortality ratio: cohort study from Bangladesh. *Hum Vaccin Immunother* 2021; 17(1): 197-204
105. Øland CB, Mogensen SW, Rodrigues A, Benn CS, **Aaby P**. Reduced Mortality After Oral Polio Vaccination and Increased Mortality After Diphtheria-tetanus-pertussis Vaccination in Children in a Low-income Setting. *Clin Ther* 2021; 43(1): 172-84 e7.
106. Jensen KJ, Tolstrup LK, Knobel DL, **Aaby P**, Jungersen G, Larsen LE, Kristensen CS, Benn CS. Non-specific effects of maternal and offspring rabies vaccination on mortality and antibiotic use in a Danish pig herd: A randomized trial. *Vaccine*. 2021 Apr 9:S0264-410X(21)00399-6. doi: 10.1016/j.vaccine.2021.03.083.
107. Schaltz-Buchholzer F, **Aaby P**, Monteiro I, Camala L, Simonsen SF, Frankel NN, Larsen KL, Golding CN, Kollmann TN, Amenyogbe N, Benn CS, Bjerregaard-Andersen M. Immediate Bacille Calmette-Guérin vaccination to neonates requiring perinatal treatment at the maternity ward in Guinea-Bissau: A randomized controlled trial. *J Infect Dis* 2021
108. Nielsen S, Khalek MA, Benn CS, **Aaby P**, Hanifi SMA. National immunisations campaigns with oral polio vaccine may reduce all-cause mortality: An analysis of demographic surveillance data in rural Bangladesh from 2004 to 2019. *EclinMed* (in press)
109. Byberg et al. The effect of disregarding the strategy to save doses of measles vaccine in Guinea-Bissau – a cluster-randomized trial. *BMJ Global health* (in press)