



Covid 19 vaccine

Flu vaccine

Anti-Louse vaccine?

The Covid-19 pandemic seems to have triggered an interest in epi/pandemics. During 2020 we saw a small cluster of publications focussing on that louse-borne pathogen *Rickettsia prowazekii* and typhus, with four of them reviewing the epidemic in Warsaw during 1940-41 and how the management of that epidemic in and by the community achieved a level of control by simple measures that could have been applied to this coronavirus:

Kritz F. The Warsaw Ghetto can teach the world how to beat back an outbreak. NPR 2020; 2 September: <https://www.npr.org/sections/goatsandsoda/2020/09/02/908732924/the-warsaw-ghetto-can-teach-the-world-how-to-beat-back-an-outbreak?t=1633615332587>.

Sexton C. How a public health campaign in the Warsaw Ghetto stemmed the spread of typhus. Smithsonian Magazine 2020, July 27.

Stix G. World War II's Warsaw Ghetto hold lifesaving lessons for Covid-19. Scientific American 2020; July 24.

Stone L, He D, Lehnstaedt S, Artzy-Randrup Y. Extraordinary curtailment of massive typhus epidemic in the Warsaw Ghetto. Science Advances 2020; 6(30): eabc0927. doi: 10.1126/sciadv.abc0927.

Vázquez-Espinosa E, Laganà C, Vazquez F. John Donne, Spanish Doctors and the epidemic typhus: fleas or lice? Revista Española de Quimioterapia 2020; 33(2): 87-93. doi: 10.37201/req/107.2019.

I'm not sure how much attention was paid to the lessons learned 80 years ago by those dealing with the current pandemic – judging by personal observation – not a great deal and passing these on to the general populace sometime fell far short of successful. WHO and many national infection control authorities certainly seem to have failed to take those lessons to heart in the early stages and only belatedly have some of them come to understand the simple infection control measures that need to be applied. Perhaps if some lessons had been implemented sooner the world impact of the virus would have been lower. Of course, it is easy to be wise in hindsight, and when you don't have that responsibility, but some of us could see the errors early on.

Since last writing the concerted effort to develop and rollout the Covid-19 vaccines has had a significant impact on the mortality and morbidity from the infection. Admittedly, apart from a few developed economies, this programme is still relatively incomplete but where progress has been made life has in some way or another returned to normal, along with various communities coming to terms with the reality that disease and infection are part of everyday life. Nevertheless, despite the success of the vaccination programmes in some countries there is still considerable vaccination hesitancy (what a lovely euphemistic term!), and that made me think about past and current considerations of vaccines against lice.

For lice of domesticated animals, vaccination against ectoparasites would not pose any cultural issues, and there are commercially available vaccines against cattle ticks and some other species. The main limitation on use of these vaccines is the cost benefit balance because they are generally species specific and mainly targeted against specific antigens that are “hidden” within the parasite that do not normally come into direct contact with the host immune system. Consequently, the main hurdle for use of such vaccines is frequent booster shots to ensure the host immune system maintains a high enough titre of the appropriate immunoglobulins that parasite gut function would be compromised. Of course, in the case of lice, developing a vaccine is simpler when targeting sucking lice because any blood imbibed could carry antibodies directly to target sites in a similar way to the tick vaccine. Aiming a vaccine against chewing lice is a much harder proposition, which is why pour-on and orally administered systemically distributed pesticides are often easier to use in the long run.

When it comes to human lice, how many of us have heard the cry, “Oh, I wish there was a pill or vaccine against head lice!” Well, of course, we already have possible oral treatments for head lice. Co-trimoxazole (sulfamethoxazole and trimethoprim) was observed to eliminate head lice accidentally by my old friend Tony Burns over 30 years ago (Burns AD. Action of cotrimoxazole on head lice. *British Journal of Dermatology* 1987; 117(3): 399-400. doi: 10.1111/j.1365-2133.1987.tb04152.x) and there was later a clinical investigation that found it was successful and worked better along with topical permethrin (Hipolito, et al. Head lice infestation: single drug versus combination therapy with one percent permethrin and trimethoprim/sulfamethoxazole. *Pediatrics* 2001; 107(3): E30. doi: 10.1542/peds.107.3.e30). Not that I would encourage anyone to use co-trimoxazole for this purpose. It has too many possible side effects, not the least of which is the potential for Jarisch-Herxheimer reactions in some people.

More recently oral ivermectin has been shown to give high rates of cure (e.g. Chosidow, et al. Oral ivermectin versus malathion lotion for difficult-to-treat head lice. *New England Journal of Medicine* 2010; 362(10): 896-905. doi: 10.1056/NEJMoa0905471) as well as several other studies performed mainly in developing countries yet, when it comes down to practicality, orally administered drugs of this type are primarily of interest to the dermatologist keen to “scientifically” deal with an infestation issue with minimum fuss. In contrast, the regulators see it as a third line approach to be used only when all else has failed and many of the parents who have said how much they would want the “magic bullet” of an oral treatment would actually rather have it administered to the “other children” that they perceive as the “source of the problem” rather than their own kids. Overall, they are much happier using topical ivermectin, as recent studies and regulatory developments to make it available as an over-the-counter product in the USA have shown.

Which brings me back to vaccines. Even if we were to be able to develop an anti-head louse vaccine, how many people would take it up? Given the reluctance of many to receive a potentially life-saving Covid-19 vaccination, not only for themselves but more especially for their children in those countries where that is either available or discussed, does anyone think they will rush to have their kids vaccinated against lice? As one parent said to me a few years back when challenged about why she had not treated her family to get rid of a long-term infestation, “Head lice never killed anyone, so we are just going to live with them!” Perhaps not in their case, but we have seen a few cases of pathological severe iron deficiency anaemia associated with human louse infestation in the press (e.g. <https://www.news.com.au/lifestyle/real-life/news-life/girl-12-dies-after-severe-head-lice-infestation-causes-heart-attack/news-story/0573c2db2c9052c35889cec246619dcc> and <https://www.newsweek.com/child-left-near-death-blood-loss-lice-infestation-1590651>) apart from the following clinical publications from the past few years:

Althomali SA, Alzubaidi LM, Alkhalidi DM. Severe iron deficiency anaemia associated with heavy lice infestation in a young woman. *BMJ Case Reports* 2015; 2015: bcr2015212207. doi: 10.1136/bcr-2015-212207.

Batool N, Song D, Reyes JVM, Ahmad S, Skulkidis A, Almas T, Khedro T, Brown M. Ectoparasitosis, a rare cause of severe iron deficiency anemia: A case report. *Annals of Medicine and Surgery (Lond)* 2021; 69: 102784. doi: 10.1016/j.amsu.2021.102784

Burke S, Mir P. Pediculosis causing iron deficiency anaemia in school children. *Archives of Diseases of Childhood* 2011; 96(10): 989. doi: 10.1136/archdischild-2011-300791.

Guss DA, Koenig M, Castillo EM. Severe iron deficiency anemia and lice infestation. *Journal of Emergency Medicine* 2011; 41(4): 362-365. doi: 10.1016/j.jemermed.2010.05.030.

Hau V, Muhi-Iddin N. A ghost covered in lice: a case of severe blood loss with long-standing heavy pediculosis capitis infestation. *BMJ Case Reports* 2014; 2014: bcr2014206623. doi: 10.1136/bcr-2014-206623.

Lowenstein EJ, Parish LC, Van Leer-Greenberg M, Hoenig LJ. The darker side of head lice infestations. *Clinics in Dermatology* 2021; doi: 10.1016/j.clindermatol.2021.01.010

Ronsley R, Ling F, Rehms W, Dmytryshyn A. Lice infestation causing severe anemia in a 4-year-old child. *Canadian Family Physician* 2019; 65(7): 473-475.

Sudayasa IP, Arimaswati A, Abdullah M, Masumi AR. The influence of head lice (*pediculus (sic) humanus capitis*) infestation to nutritional status and anemia occurrence on female elementary school students. 2018\_IOP Conference Series: Materials Science and Engineering 2018; 434: 012317.

Woodruff CM, Chang AY. More than skin deep: Severe iron deficiency anemia and eosinophilia associated with pediculosis capitis and corporis infestation. *JAAD Case Reports* 2019; 5(5): 444-447. doi: 10.1016/j.jdc.2019.03.001.

Have lice become more pathological? Unlikely. Have parents and carers become less caring? Also unlikely. Maybe we have just become more aware of lice and the potential, if left untreated, for them to induce pathological effects.

Returning to a theme mentioned last year, whether lice have been affected by the coronavirus lockdowns or whether they are carrying on with life as normal. Many of you will be aware of the study by our Argentinian friends showing fewer cases in some Buenos Aires schools (Galassi F, et al. Head lice were also affected by COVID-19: a decrease on Pediculosis infestation during lockdown in Buenos Aires. *Parasitology Research*. 2021; 120: 443-450. doi: 10.1007/s00436-020-07038-y). But has that been the case more widely? Perhaps sales of treatment products can give a guide. ISI figures for treatment sales in the UK have shown that fewer products were bought, with a drop of 42.8% in the number of units of treatment of all types of product sold during the 52 weeks up until June 2021 compared with the same period leading up to June 2020. But there was a recovery during 2021 with a 21.0% reduction during the 12 weeks leading to June '21 and 28.9% reduction in the 4 weeks to June '21 (although most of that reduction 52.2% was in minor brands while some major brands actually sold more than the year before). So, head lice are coming back and certainly appear unaffected overall by the pandemic, as hinted at in my comments in last year's Newsletter (October 2020).

## Publications

As with previous years 2020 proved to be good for louse publications generally and I have found 185 on human, mammal, and bird lice. A few online publications released in 2020 have been moved to the 2021 list following “paper” publication where they acquired volume and page identifiers. So, if your “online first” doesn’t show that would likely be the explanation. As previously, a few slow to appear publications have also been listed from 2019 and 2018, as well as 33 articles on other Psocodea.