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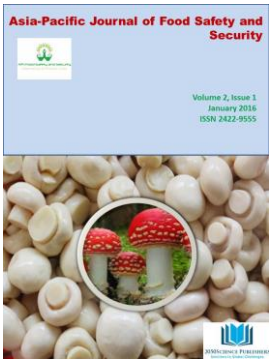
Commentary

Campylobacter, *Helicobacter* and related organisms: An international conference and a global challenge



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The international conferences on *Campylobacter*, *Helicobacter* and Related Organisms (CHRO) were established in 1981, predominantly as the public health impact of *Campylobacter* infections became increasingly recognised. The veterinary significance of bovine and ovine infections with *Campylobacter fetus* (resulting in either abortion or infertility, depending on the subspecies infecting the host) was already well established (Smith and Taylor, 1919). The conferences have been held biannually ever since. The 18th such conference – CHRO 2015 - was held in New Zealand. It was the first time in the history of CHRO conferences that an inaugural presentation secured the rights to host, making New Zealand an even more special destination.

It was fitting therefore that CHRO 2015 sported a number of features not exhibited previously in earlier conferences of its type. CHRO 2015 was held in November and had its own Facebook page (https://www.facebook.com/CHRO-2015-242319352598056/?ref=hl). The conference featured a dedicated session on the emerging pathogen *Arcobacter*, and it facilitated workshops on both source attribution and control in poultry and non-poultry sources that reflected the evolving direction of the research presented. A "late breaker" session was another innovation, offering the possibility for abstracts to be submitted as late as two weeks prior to the conference to be reviewed and presented. The conference was also held in conjunction with the annual scientific meeting of the New Zealand Microbiological Society (http://www.nzms.org.nz/), maximising the scientific scope and value to attendees of both conferences. The tone of CHRO 2015 was firmly set at the welcome reception on the first day, which provided an opportunity for delegates to socialise and be exposed to the rich indigenous culture of New Zealand. The Mithai Māori village was the perfect setting for this event.

CHRO 2015 offered over 140 talks across 33 individual sessions, over 150 posters, and 11 plenary lectures from leading international experts in topics as diverse as the role (and management) of *Helicobacter pylori* in gastric cancer; new techniques and approaches for genomic epidemiology; socio-microbiology; and innovation in the development of vaccines for *C. jejuni* and *C. fetus*. The conference had been successful in attracting sponsorship from a number of national and international agencies and commercial companies, all of whom were acknowledged appropriately in the conference programme, in a circulating display in the plenary lecture theatre between presentations, and in the opening and closing presentations of the conference.

The overall content of the conference represented a marked change from that of previous conferences and clearly reflected some significant scientific evolution in the field. There was less emphasis placed on new methods for sub-typing, while far more emphasis was placed on approaches to analyse and interpret data from methods that have either been widely adopted (Multi-Locus Sequence Typing) or are just emerging (Whole Genome Sequencing). From that perspective, the workshop on Source attribution was timely, and its utility perhaps emphasised by the attendance level – approximately 40 persons. Presentations and posters using these methods continued to highlight the complexity of the epidemiology of human campylobacteriosis, with sources including, notably, wild birds and surface waters (Cody et al., 2015); shellfish (Gourmelon et al., 2015) and even cantaloupe (Pogreba-Brown et al., 2015) identified as possible sources for further consideration. The rapid emergence of an antibiotic-resistant clone of *C. jejuni* in NZ poultry and human illness (French et al., 2015) emphasised the need for continued awareness in the field and of strategies for its management. Data presented on frequency of contamination of meats in Pakistan with strains resistant to multiple antibiotics (Nisar et al., 2015) served to highlight the problem internationally.

Similarly, the increasing availability and use of Matrix Assisted-Laser Desorption/Ionization coupled to Time-Of-Flight mass spectrometry (MALDI-TOF) in clinical laboratories particularly is transforming how bacteria are being identified (Moses et al., 2015); however, presentations emphasised the need for cautious interpretation of data where taxa were represented by only a limited number of strains, not represented at all or in a few cases, mislabeled. All of these are common sources of error in developing any novel identification methodology (Van den Abeele et al., 2015). In a field as rapidly developing as CHRO, the need for such caution is well established and exemplified from the emerging pathogen *Arcobacter*, where a range of novel species from food (notably of marine origin) and the environment have been described in recent years (Levican et al., 2014); even for the more established species (*A. butzleri*, *A. cryaerophilus*), challenges remain. Another presentation regarding *C. fetus* emphasised the challenges of strain identification in routine laboratories in the field, under pressure and where the taxonomic separation is difficult (Indjein et al., 2015). For the reproductive bovine and ovine pathogens *C. fetus* subsp. *fetus* and *C. fetus* subsp. *venerealis*, their pathogenic properties appear defined by the presence or absence of a genomic island just over 45 kB long (Gorkiewicz et al., 2010), and while the influence on pathogenic potential is significant, the analysis is far from trivial.

What was especially heartening to see at CHRO 2015 was the substantive increase in presentations and lectures in the area of control and management, especially of *Campylobacter* in the food chain. Three separate sessions, a workshop, a session dedicated to vaccine development, plus two plenary talks on different aspects of *Campylobacter* control within the food chain clearly demonstrated that we have come a long way in understanding the importance of campylobacters in production animals and of the need to mitigate them. Nonetheless, the difficulties in mitigation are well recognized, and the dedicated workshop session was perhaps the clearest example of these challenges. The workshop began with presentations from regulators, industry representatives, and academics from New Zealand,

the USA and UK, who described the use of currently available interventions and their impact on carriage in poultry. The results of the New Zealand interventions are well known and their implementation largely credited with a substantive (ca. 50%) reduction in the human incidence of campylobacteriosis (Sears et al., 2011). Industry has credited the main decrease in carcass carriage to new evisceration technologies (R. Biggs, unpublished data), with supplementary presentations showing that chlorinated chiller rinses have also contributed to the observed reductions (Van der Logt et al., 2015). The use of chemical rinsates is not favoured in the USA or Europe, and presentations on current methods used in the USA (K. Hiett, unpublished data) and the UK (R. Madden, unpublished data) served to illustrate that other approaches offer at best a minimal impact on carriage rate, with improved biosecurity the only approach that boasted any level of effect at all. Results from a recently concluded EC-funded project ("Campycon"), and a recently instigated one ("Campybro"), also highlighted the difficulties, with vaccine and phage-based approaches tested in the former proving inef-fective (J. Wagenaar, unpublished data), and a feed-based strategy in the former showing some modest promise (Millán et al., 2015). If any major progress was demonstrated, it was in the presentation of a new recombinant vaccine using a 17 kB conserved locus expressing a heptasaccharide in *E. coli* (Nothaft et al., 2015) (also see www.vaxalta.com). However, the genetically engineered origins of the vaccine would prove challenging in countries such as New Zealand, with its stringent biosecurity rules and opposition to GM technologies. Thus, the world still faces considerable challenges in reducing the burden of human campylobacteriosis, but there seems to be more activity and more progress in this area of research.

The above provides only the scantest insight into the depth and breadth of the CHRO research presented and discussed at the conference. The full conference programme and associated abstracts can be downloaded, for a limited time, from www.chro2015.com to pro-vide more detail. What was clear was that many new areas have opened with exciting leads being followed, and indeed new collaborations were formed among researchers from around the world. CHRO 2015 hosted over 260 participants from 33 countries, and integration of the annual New Zealand Microbiological Society conference, with its additional 130 participants, added further aspects and interests from the field of microbiology. Since the conference closed, we have received many thank-you messages and congratulations, such as:
"…thanks for organising a great conference in terms of the science, friendliness and fun."
"What a great conference in New Zealand. I am truly inspired with the great work done by everyone."
"The conference was great & the location was amazing. I wish I had been able to stay longer!"

We have yet to hear a single complaint and were very pleased with the result. We know that many delegates took time before or after the conference to explore New Zealand and thus the benefits to all were not exclusively scientific. Our choice of venue was very well justified with excellent staff and service in a great venue with outstanding surroundings. As Convenor, I was blessed with dedicated and enthusiastic 'Organising and Scientific commit-tees' who were absolutely vital to the success of CHRO 2015. Finally, on behalf of these committees, I would like to thank all the sponsors for playing their part in a successful and satisfying conference, the benefits of which I believe will be felt in New Zealand for some time to come, including the professional pride and satisfaction that I will feel for a lifetime.

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