• **Name:** Aaron Hansen

• **Current Position & Affiliation:** Associate Professor, Medical Oncology, Medicine, University of Toronto, Toronto, Ontario, Canada

• **Country:** Canada

• Educational Background:

Degrees

2001 Jan - 2004 Dec	Bachelor of Medicine and Bachelor of Surgery, Herston Medical School, University of Queensland, Brisbane, Australia
1998 Jan - 2000 Dec	BSc, Biomedical Science, University of Queensland, Brisbane, Australia

Postgraduate, Research and Specialty Training

2012 Jan - 2014 Jun	Clinical Research Fellow, Drug Development, Phase I Program, Princess Margaret Cancer Centre, Toronto, Ontario, Canada
2009 Jan - 2012 Jan	Advanced Trainee, Medical Oncology, Medical Oncology, Princess Alexandra Hospital, Brisbane, Australia
2007 Jan - 2009 Jan	Registrar, Internal Medicine Subspecialities, Dept of Medicine, Princess Alexandra Hospital, Brisbane, Australia
2005 Jan - 2007 Jan	Resident, Internal Medicine, Dept of Medicine, Princess Alexandra Hospital, Brisbane, Australia

• Professional Experience:

Current Appointments

2021 Jul - present	Associate Professor, Medical Oncology, Medicine, University of Toronto, Toronto, Ontario, Canada
2018 May 1 - present	Medical Oncology Site Lead for Genitourinary Cancers, Medical Oncology, Medicine, Princess Margaret Cancer Centre, Toronto, Ontario, Canada *I manage a team of around 25 personnel, including 3 staff medical oncologists, 4 clinical research fellows, 4 clinical trial nurses, 6 ambulatory care nurses, between 4-6 research coordinators and 2 administrative assistants. I have between 6-10 personnel directly report to me.*
2015 Mar - present	Staff Medical Oncologist, Clinician Investigator, Medical Oncology, Medicine, Princess Margaret Cancer Centre, University Health Network, Toronto, Ontario, Canada

Previous Appointments

HOSPITAL

2014 Jul - 2015 Feb	Associate Medical Oncologist, Medical Oncology, Medicine, Princess

	Margaret Cancer Centre, University Health Network, Toronto, Ontario, Canada

UNIVERSITY

2015 Mar - 2021 Jun	Assistant Professor, Medical Oncology, Medicine, University of Toronto, Toronto, Ontario, Canada
2014 Nov - 2015 Feb	Lecturer, Medical Oncology, Medicine, University of Toronto, Toronto, Ontario, Canada

• Professional Organizations:

Professional Associations

2017 Oct - present	Member, Canadian Cancer Trials Group, IND Committee
2017 Oct - present	Member, Canadian Cancer Trials Group, Quality of Life Committee
2016 Apr - present	Member, American Association of Cancer Research
2011 Jan - present	Member, European Society of Medical Oncology
2009 Jan - present	Member, American Society of Clinical Oncology
2009 Jan - present	Member, Medical Oncology Group of Australia
2006 Jan - present	Member, Australian Medical Association

• Main Scientific Publications:

MOST SIGNIFICANT PUBLICATIONS

1. Veitch ZW, Shepshelovich D, Gallagher C, Wang L, Abdul Razak AR, Spreafico A, Bedard PL, Siu LL, Minasian L and Hansen AR. Underreporting of symptomatic adverse events in phase I clinical trials. Journal of National Cancer Institute. 2021 Jan 4. In Press. Impact Factor 13.506 (Trainee publication, Veitch ZW). **Senior Responsible Author.**

   Clinician reporting of symptomatic adverse events (AEs) in phase I trials utilizes the Common Terminology Criteria for Adverse Events (CTCAE). The utility of the patient-reported outcomes (PRO) version of the CTCAE (PRO-CTCAE) in this setting is unknown. This prospective, observational study compared patient- and clinician-reported symptomatic- AEs in phase I patients. Of 292 patients approached from 05/2017-01/2019, 265 (90.8%) were consented, with 243 (91.7%) evaluable and 552 PRO-CTCAE surveys (completion rate = 98.7%) included in analyses. Evaluation of overall patient-reported symptomatic-AEs identified 50 PRO-CTCAE and 11 CTCAE items with ≥10% reporting frequency. 19 CTCAE items were reported at ≤ 1% despite matched PRO-CTCAE items with reporting ≥10%. Clinician-relative to patient-reporting frequency (ratio) demonstrated 9 symptomatic-AEs with a ≥ 50-fold lower clinician reporting rate. Overall patient-clinician agreement for individual symptomatic-AEs ranged from poor (kappa = 0.00-0.19) to moderate (kappa = 0.40-0.59) with discordance driven by lack of clinician reporting. Poor to moderate patient-clinician agreement for symptomatic-AEs suggests clinician underreporting in phase I trials. This was the first time under reporting of symptomatic AEs in phase I trials was reported.

2. Ala-Leppilampi K, Baker NA, McKillop C, Butler MO, Siu LL, Spreafico A, Abdul Razak AR, Joshua AM, Hogg D, Bedard PL, Leighl N, Oza AM, Parsons JA, Hansen AR. Cancer patients'

experiences with immune checkpoint modulators: A qualitative study. Cancer Medicine. 2020 Mar 2. Impact Factor 3.362. **Senior Responsible Author.**

Minimal qualitative data exists on the experiences of cancer patients treated with immune checkpoint inhibitors or costimulatory antibodies. Understanding their daily experiences and how these relate to their health related quality of life can inform future research. This single center qualitative study was based on focus groups and semi-structured interviews of patients treated with immune checkpoint modulators within the last year. Eight themes were identified, characterizing the complexity of these patients' lived experiences: major categories of side effects experienced and how they impacted patient well-being; the heterogeneous nature of side effects experienced; living with uncertainty; reframing the meaning and severity of SEs; focus on survival, hope and being positive; acceptance and adaptation; feeling supported; and faith in medical innovation. This is the first in-depth qualitative study into patient accounts of their experiences of treatment with immune checkpoint modulators, related side effects, and how it impacted their daily lives. This research is an integral initial step in developing an instrument that will assess treatment-related side effects in patients who received this form of therapy.

3. Hansen AR, Ala-Leppilampi K, McKillop C, Siu LL, Bedard PL, Abdul Razak AR, Spreafico A, Sridhar SS, Leighl N, Butler MO, Hogg D, Sacher A, Oza AM, Al-Agha R, Maurice C, Chan CT, Shapera S, Feld JJ, Nisenbaum R, Webster K, Cella D, Parsons J. Development of the Functional Assessment of Cancer Therapy-Immune Checkpoint Modulator (FACT-ICM): A toxicity subscale to measure quality of life in patients with cancer who are treated with ICMs. Cancer. 2020 Jan 8. Impact Factor 5.742. **Principal Author.**

Patients with cancer who are treated with immune checkpoint modulators (ICMs) have their health-related quality of life (HRQOL) measured using general patient-reported outcome (PRO) tools. At the time of this study, no instrument had been developed for patients treated with ICMs. Focus groups and individual interviews with 37 ICM-treated patients generated an initial list of 176 items. After a first round of item reduction that produced a shortened list of 76 items, 16 physicians who care for patients treated with ICMs were surveyed with a list of 49 patient-reported side effects and 11 physicians participated in follow-up interviews. A second round of item reduction was informed by the physician responses to produce a list of 25 items. This 25-item list is the first HRQOL-focused toxicity subscale for patients treated with ICMs and was developed in accordance with US FDA guidelines, which prioritize patient input in developing PRO tools. The subscale will be combined with the Functional Assessment of Cancer Therapy-General (FACT-G) to form the FACT-ICM. This is the first tool of its kind to measure HRQOL in patients receiving ICMs and further validation is ongoing.

4. Khoja L, Day D, Wei-Wu Chen T, Siu LL, Hansen AR. Tumour- and class-specific patterns of immune-related adverse events of immune checkpoint inhibitors: a systematic review. Annals of Oncology. 2017 Oct 1;28(10):2377-2385. Impact Factor 32.976 (Trainee publication, Leila Khoja). **Senior Responsible Author.**

Immune checkpoint inhibitor (ICI) monoclonal antibodies (mAbs) targeting cytotoxic T-lymphocyte antigen 4 (CTLA-4), programmed cell death protein 1 (PD-1) or its ligand (PD-L1) produce unique toxicity profiles. Medline, EMBASE and COCHRANE databases were searched to identify prospective monotherapy trials of ICIs from 2003 to November 2015. We identified 48 trials (6938 patients), including 26 CTLA-4, 17 PD-1, 2 PD-L1 trials, and 3 studies tested both CTLA-4 and PD-1. Grade 3/4 irAE were more common with CTLA-4 mAbs compared with

PD-1 (31% versus 10%). All grades colitis, hypophysitis and rash were more frequent with CTLA-4 mAbs; whereas pneumonitis, hypothyroidism, arthralgia and vitiligo were more common with PD-1 mAbs. Comparison of irAE from the three most studied tumour types in PD-1 mAbs trials [melanoma, non-small-cell lung cancer and renal cell carcinoma] showed melanoma patients had a higher frequency of gastrointestinal and skin irAE and lower frequency of pneumonitis. Different immune microenvironments may drive histology-specific irAE patterns and we showed that different tumors have different irAE profiles. We demonstrated for the first time that CTLA-4 and PD-1 mAbs have distinct irAE profiles.

5. Chen TW, Razak AR, Bedard PL, Siu LL, Hansen AR. A systematic review of immune-related adverse event (irAE) reporting in clinical trials of immune checkpoint inhibitors (ICIs). Annals of Oncology. 2015 Sep 1;26(9):1824-9. Impact Factor 32.976 (Trainee publication, Tom Wei-Wu Chen). **Senior Responsible Author.**

   After a review of 2628 articles, 50 trial reports were included, with immune checkpoint inhibitors as either monotherapy (54%) or part of a combination regimen (46%). The median grade 3/4 AE rate reported was 21% (range 0%-66%) and 29/50 (58%) trials concluded that irAEs were tolerable. Complete reporting of specific characteristics of irAEs including onset, management and reversibility were reported by 14%, 8% and 6% of studies, respectively. The incidence of grade 3/4 adverse events was higher for inhibitors against CTLA-4 compared with other immune checkpoints ($P < 0.001$). The reporting of irAEs is suboptimal. A standardized reporting method of irAEs that accounts for tolerability, management and reversibility is needed and would enable a more precise evaluation of the therapeutic risk benefit ratio of ICIs.