Third International Workshop on Chronic Kidney Diseases of Uncertain/Non-traditional Etiology in Mesoamerica and Other Regions

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San José, Costa Rica

Summary Report

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Third International Workshop Organization

The Third International Workshop on Chronic Kidney Diseases of Uncertain/Non-traditional Etiology in Mesoamerica and Other Regions was held in San José, Costa Rica March 20-22, 2019, with the participation of 137 participants from 15 countries. The meeting was hosted by the Central American Program for Health, Work and Environment (SALTRA) and the Regional Institute for Studies on Toxic Substances (IRET) of the National University (UNA), Costa Rica. The workshop represented a collaboration between the Consortium for the Epidemic of Nephropathy in Central America and Mexico (CENCAM), the National Institute of Environmental Health Sciences (NIEHS) and the National Institute for Diabetes and Digestive and Kidney Diseases (NIDDK) of the National Institutes of Health in the United States, the Central American Institute for Studies on Toxic Substances (IRET), and World Health Organization (WHO) Regional Offices, Pan American Health Organization (PAHO), and South-East Asia Regional Office (SEARO). Workshop participants included specialists from diverse backgrounds including nephrology, epidemiology, occupational health, environmental health, toxicology, nephropathology, anthropology, and exposure assessment.

The Third International Workshop built on previous workshops and broadened participation. Here, Dr. Nalika Gunawardena delivers a message from Dr. Poonam Khetrapal Singh, Regional Director, WHO South East Asia Region at the opening ceremony.

Pre-Workshop Meeting for Clinical Training

A pre-workshop training meeting in Liberia, Costa Rica, was held on March 19, 2019 for 120 healthcare providers and personnel responsible for health surveillance in a CKDu-endemic region. This event was organized by the Costa Rican Health Care and Social Security System (CCSS), the Costa Rican Association of Nephrologists, the Latin American Society of Nephrology and Hypertension (SLANH), and CENCAM. CENCAM members Dr. Ricardo Correa-Rotter (México), Dr. Ramón García-Trabanino (El Salvador) and Dr. Jennifer Crowe (Costa Rica) gave presentations. The training allowed for a discussion of patient treatment, ways to improve registries, and approaches to collaboration across institutions.

One day before the workshop, a training session was held for CCSS employees in CKDu-affected parts of Costa Rica. Here, Dr. Ramón García-Trabanino (El Salvador), Dr. Ricardo Correa-Rotter (Mexico), Dr. Javier Estrada (CCSS, Costa Rica), Dr. Jennifer Crowe (Costa Rica), and Erika Masis-Cordero (not pictured) participate in a panel discussion in Liberia, Costa Rica.

History

This workshop built on previous international workshops organized by SALTRA. The first took place in Nicaragua in 2005 [1] and the second took place in Costa Rica in 2009 [2], including nephrologists and epidemiologists from the Central American region. These were followed by larger workshops in Costa Rica in 2012 [3] and 2015 [4], a workshop on CKDu organized by SEARO in 2016 [5], and a 2018 workshop organized by NIDDK and NIEHS [6]. Previous workshops have aimed to summarize scientific knowledge or hypotheses about the possible etiologies of the disease and increase cross-disciplinary and international collaborations. This 2019 meeting had the highest attendance of any meeting on CKDu[1] to date, and included the greatest diversity across CKDu impacted regions, with participants from Sri Lanka, India, Mexico, and Central American countries as well as researchers from the United States and Europe.

Meeting Objectives

The specific aims of the 2019 Third International Meeting were:

[1] Although the term CKDu is used here, workshop organizers recognize the use of multiple names for the disease including Chronic Kidney Diseases of Non-traditional Etiology (CKDnt) as well as regional names. Mesoamerican Nephropathy (MeN) and Chronic interstitial nephritis in agricultural communities (CINAC) (used in Sri Lanka).

- Update the current knowledge and knowledge gaps related to Mesoamerican Nephropathy and other CKDu epidemics identified around the globe.
- Discuss research agendas to compare disease occurrence between different countries and fill knowledge gaps (including evidence for potential risk factors of CKDu, methodological considerations and current understanding of CKDu etiology).
- Increase and facilitate collaborations and relationships between researchers and clinicians studying and involved in the care of CKDu.
- Compile and communicate evidence that can be used by policymakers to improve prevention and treatment of CKDu epidemics.
- Take advantage of the presence of experts at the workshop to organize a pre-workshop course to share existing knowledge about CKDu and related topics.

Agenda and Meeting Materials

The workshop was intended to be a space for productive collaboration, and as such, much of the three-day event was dedicated to working group discussions. The complete program can be found on the workshop website:
https://www.niehs.nih.gov/news/events/pastmtg/2019/ckd_2019/index.cfm (Agenda: https://www.niehs.nih.gov/news/events/pastmtg/assets/docs_c_e/ckd_agenda_508.pdf).
The Meeting Book includes the agenda, poster abstracts, working group descriptions, and list of participants:
https://www.niehs.nih.gov/news/events/pastmtg/assets/docs_c_e/ckd_meetingbook_508.pdf.

Inaugural session

The meeting opened with remarks from:

- Dr. Denis Angulo Alguera, Vice Minister of Health, Costa Rican Ministry of Health
- Dr. Linda Birnbaum, Director, National Institute of Environmental Health Sciences (NIEHS) and National Toxicology Program, National Institutes of Health (NIH), U.S.
- Dr. Enrique Pérez-Flores, Pan American Health Organization (PAHO)/ World Health Organization (WHO), Costa Rica
- Dr. Nalika Gunawardena, in representation of Dr. Poonam Khetrapal Singh, Regional Director, WHO South East Asia Region (SEARO)
- Dr. Norman Solorzano, Representative, Vice Rectory for Research, Universidad Nacional Costa Rica (UNA)
- Dr. Ricardo Correa-Rotter, Consortium for the Epidemic of Nephropathy in Central America and Mexico (CENCAM)
- Dr. Jennifer Crowe, Central American Program for Health Work and Environment Program (SALTRA), IRET-Universidad Nacional, Costa Rica

The workshop opened with an inaugural session with comments from the institutions represented on the organizing committee (left). The keynote presentation, "Endemic CKDu: Is it primarily an occupational disease?" was given by Dr. Catharina Wesseling (right).

World Café

Since workshop participants came from a wide variety of disciplines, countries and languages, the first interactive activity involved round table discussions following a "World Café" format [7], designed to allow participants to meet as many new people as possible and to express their opinions and thoughts about three main questions:

1. What do we know about the disease?
2. What do I/we need to know about the disease?
3. How can I/we move forward?

The World Café format, shown above, allowed early, open communication from all 137 workshop attendees regarding what we know, need to know and how we should move forward.

What do we know? During roundtable discussions, most participants expressed awareness of the following:

- **Heavy disease burden in populations of poverty:** The disease impacts agricultural workers such as sugarcane workers and other rural communities, all of them experiencing a high burden of poverty. The disease overwhelms hospitals with patients in specific regions where clinicians have limited capacity to handle CKDu.
- **Multifactorial:** Most perspectives were that the disease is likely multifactorial, involves exposure to heat/heat stress, potential exposure to toxic agrochemicals, and other factors.

- **Sex differences:** In some, but not all, regions, CKDu is more prevalent among males compared to females, which may reflect occupational differences or other variability in exposures.
- **Pathology has notable similarities to what is seen in primary tubulointerstitial diseases leading to CKD:** The pathology involves tubular atrophy and interstitial fibrosis, with limited morphologic changes in the vasculature and glomeruli.
- **Research is challenging:** Many studies are limited in the characterization of potential risk factors, time points captured, data and sample collected, and the challenging logistics of research in resource-limited settings.

What do we need to know? Workshop participants expressed a need to better understand many things. Some points discussed are noted below. This is not comprehensive of all discussion content:

- **CKDu etiology and natural history:** More information is needed to understand the etiology of CKDu, and nature of progression as was noted in previous international workshops on CKDu.
- **Risk factors by region:** The variability in risk factors driving CKDu incidence in Southeast Asia compared to Central America remains unclear. For example, are the same risk factors involved or are there different factors with similar pathophysiology? Are we observing the same or different diseases? Why does CKDu not occur (or less characterized) in the Caribbean, Africa, and elsewhere around the globe? What is the influence of altitude?
- **Multifactorial etiology and interactions:** What are the potential interactions between studied risk factors and diet, NSAIDS, social factors, and other exposures?
- **Genetic susceptibility:** What role do genetics and epigenetics play in CKDu?
- **Early life exposures:** How are early life exposures in developmental time windows (perinatal, early childhood) involved? What role does birth weight play in susceptibility?
- **Experimental models:** Development and validation of a range of animal models was recognized as necessary to advance our understanding.

How can we move forward? Some of the needs discussed by workshop participants are listed below. This is not a comprehensive list nor does it represent consensus across participants. Rather, examples listed indicate the types of discussions held.

- Further standardize exposure and outcome measurements
- Utilize biomarkers for early detection
- Investigate possible CKDu in migrant females
- Incorporate other lifestyle factors
- Explore early life exposures
- Incorporate social determinants of health in research
- Conduct more animal studies
- Replicate current findings and share data
- Further collaborations and combined (multicenter) studies
- Engage with companies whose employees are affected by CKDu
- Develop and evaluate evidence-based interventions in collaboration with local stakeholders
- Improve occupational conditions
- Advocate for clean water sources

- Apply science to policy action

Working Groups

All workshop attendees participated in at least one working group. The working groups were led by researchers from a wide range of organizations and countries. Working group conclusions and recommendations will be published in a separate report.

Analytical Epidemiology

- Dr. David Wegman, University of Massachusetts, Lowell, USA
- Dr. Shuchi Anand, Stanford University, USA
- Dr. Christer Hogstedt, Karolinska Institutet, Sweden

The Analytical Epidemiology (AE) Working Group aimed to discuss epidemiological approaches to investigating causes of and interventions for CKDu. In advance of the workshop they prepared a summary of CKDu case-control, cohort, and intervention studies, which were briefly reviewed in the first working group session to update participants on developments since the 2015 SALTRA/CENCAM workshop. That session also identified analytical epidemiology issues that participants viewed as priorities. The second session engaged participants in discussing how recent epidemiology studies have addressed some challenges specific to CKDu, particularly in under-resourced settings, seeking to identify key elements relevant to field epidemiology studies in such settings. The third session involved learning about and exploring on-going or planned studies with discussion on issues, such as biospecimen and data collection, analysis and reporting, results feedback, and ethics. A parallel session discussed intervention study issues, design, and experience. A fourth session was held in collaboration with several other working groups to address cross-cutting topics. The final session developed recommendations for analytical epidemiology and intervention studies.

All workshop attendees participated in a working group. Here, joint sessions between working groups allowed for multidisciplinary discussion and harmonization of recommendations. One joint session combined the Analytical Epidemiology and Pesticides/Agrochemicals Working Groups (right).

Biomarkers of Abnormal Kidney Function

- Dr. Ben Caplin, University College London Centre for Nephrology, UK
- Dr. Carl-Gustaf Elinder, Stockholm County Council; Karolinska Institutet, Sweden

The working group on Biomarkers of Abnormal Kidney Function discussed possibilities and the pros and cons of using biochemical analysis of blood and urine to diagnose, assess, evaluate, and if possible, to prognosticate CKDu. The group considered the use of biomarkers for both individuals and for epidemiological studies and surveillance programs on renal health. They discussed and evaluated the utility of biomarkers that have been employed to date, including differentiating between acute and chronic effects. They also explored the potential utility of other measures related to kidney injury and/or function. In addition, they addressed issues of field collection; sample processing, handling, and storage; laboratory analysis; and quality assurance. The group welcomed all to share individual expertise to help develop and sharpen current tools in diagnosing and investigating CKDu.

Clinical Presentation and Treatment

- Dr. Ricardo Correa Rotter, National Medical Science and Nutrition Institute Salvador Zubiran; International Society of Nephrology, Mexico
- Dr. Susan Mendley, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, USA

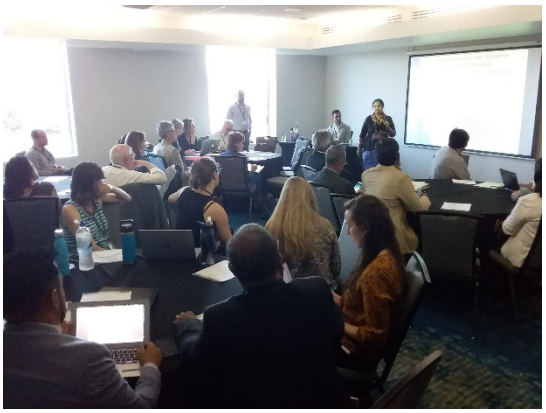
As a group of experienced nephrologists, the goal of this working group was to better understand the clinical characteristics and treatment strategies of CKD of uncertain etiology in different parts of the world. The working group assessed the unique features of the disease in each participant's region and noted its clinical presentation and how it comes to medical attention. While many features are common to different regions of the world, it was clear that important differences are present that could provide significant clues to defining the etiology in each specific region. In addition, the group reviewed how different health systems and local medical providers diagnose CKDu and handle the clinical burden. One of the main targets for the group was to recommend the development of plans or strategies for early detection, identification and adoption of preventive measures when possible, slowing progression of the disease in those cases already diagnosed, and appropriate treatment of moderately advanced and advanced CKDu.

Heat Load/Dehydration and Workload

- Dr. Vidhya Venugopal, Sri Ramachandra University, India
- Dr. Andrés Robles, Costa Rican Technical Institute, Costa Rica
- Dr. Esteban Árias, Costa Rican Technical Institute, Costa Rica

The Heat Load/Dehydration and Workload Working Group organized sessions to discuss the role of heat stress and workload in CKDu development and progression in working populations. A preliminary session on heat and workload was conducted during the 2015 CENCAM workshop. Building on that effort, the working group participants discussed more recent studies and evidence on heat stress/workload and CKD. Initial focus was placed on the literature sent to the participants in advance of the workshop to identify key issues and gaps and to prepare for discussions the following day. The second session focused on the geographical distribution of the studies on heat load, dehydration, and CKD/CKDu to understand the breadth of the problem and identify hot spots. The third working group session focused on methods and discussed the types/kinds of measurements/parameters used to assess heat load, dehydration, and CKDu/renal issues. The pros and cons and challenges of methods were also covered. Goals of the group included the development of a standard protocol for measuring heat load, heat strain and workload for use in CKDu studies. The fourth session focused on the available types of intervention studies to control

heat stress and workload in occupational settings. Joint sessions with the Analytical Epidemiology working group and other working groups were prioritized for this session. The final session focused on summarizing the discussions of the working group and plans for future collaborative projects and post-conference summaries.



Working Groups had a total of 5 sessions to complete their work. Dr. Vidhya Venugopal (India) presents during the heat working group session. All working groups were responsible for presenting advances to the other participants for open discussion. Dr. Lee Newman (USA) asks a question after a presentation from Dr. Ben Caplin (UK) for the Biomarkers working group (right).

Assessing Exposures to Pesticides, Other Agrochemicals and Metals

- Dr. Catharina Wesseling, Karolinska Institutet, La Isla Network, Costa Rica/Sweden
- Dr. Berna van Wendel de Joode, IRET, Universidad Nacional, Costa Rica
- Dr. Jill Lebov, RTI, USA

The Pesticide-Metal Working Group brought scientists together to 1) review the state of the art of pesticides/agrochemicals, metals and other toxic agents as potential risk factors of the CKDu epidemics in Mesoamerica, Sri Lanka and India, and 2) discuss methodologies needed to properly assess exposures and potential associations between these agents and CKDu. The group distributed material to read prior to the workshop, summarizing current knowledge on the potential causal role of these toxic agents on CKDu. In the first session, working group leaders presented and reviewed data from Mesoamerica, Sri Lanka, and India, including use of nephrotoxic pesticides and related exposures, and data on associations with CKDu. The main strengths and limitations of the studies were discussed. In the second session, subgroups for metals and pesticides were formed. An outline for a pesticide exposure assessment approach was presented focusing on questionnaires, external quantitative measurements, and biomonitoring. Participants were engaged in discussion of its feasibility in specific CKDu settings. In the third session, the possibility to develop common basic protocols that assess toxic agents and interactions with heat stress were addressed. During the fourth session, subgroups of the WG worked together with the Analytical Epidemiology and the Heat Load/Dehydration and Workload groups to discuss suitable study designs for pesticides/metals and for interactions of toxic agents with heat stress. The fifth session was used to summarize and discuss recommendations for future studies.

Surveillance and Screening

- Dr. Agnes Soares, Pan American Health Organization, PAHO, USA
- Dr. Jennifer Crowe, IRET, National University, Costa Rica

- Dr. José Escamilla, Pan American Health Organization, PAHO, USA

The Surveillance & Screening Working Group organized sessions to: review the current knowledge on the prevalence of the disease at the global level; assess the status (method and results) of CKDu surveillance in place in the affected countries; and review and critically assess prevalence studies and screening data (strengths, weaknesses and needs) to propose recommendations for future studies. Introductory presentations and discussions were based on information sent to the participants in advance of the workshop and aimed to review changes in scientific knowledge since the 2015 meeting. The group also dedicated time to the analysis of CKDu surveillance systems currently in place, including information flow and reporting as well as indicators and biomarkers used in current surveillance. One session was dedicated to the review of existing protocols to identify strengths and weaknesses of prevalence studies of CKDu done in Central America and in other regions with the aim of identifying future research needs. Barriers and solutions for implementing CKDu surveillance systems, criteria for screening in different settings (e.g. population-based/occupational/targeted), and ethical aspects related to these activities were discussed at length. Joint sessions were held with the Clinical group to discuss early biomarkers relevant for surveillance and screening, with the Analytical Epi group to harmonize recommendations for prevalence studies, and with other groups to discuss exposure assessment for prevalence studies and for environmental and occupational surveillance.

Molecular Approaches to CKDu: Genetics, epigenetics, and infectious disease

- Dr. David Friedman, Harvard Medical School, USA
- Rebecca Fischer, Texas A&M Health Science Center & Baylor College of Medicine

The goal of this working group was to find ways to bring powerful molecular technologies to the research of CKDu. The group considered approaches including genetics, epigenetics, pathogen detection, and other methods for understanding CKDu at a molecular level. The group discussed hypothesis testing and hypothesis-free approaches using existing technologies and addressed how these molecular tools can provide insights on the underlying biology and disease susceptibility. While technology is central to this type of investigation, a major focus of these sessions was to introduce interested non-experts to the available tools and consider study designs for specific contexts. The group enriched the conversation by engaging on topics of shared interest with other groups such as epidemiology and pathology through combined sessions.

Pathology

- Dr. Brian Berridge, National Institute of Environmental Health Sciences, National Toxicology Program, USA
- Dr. Julia Wijkstrom, Karolinska Institutet, Sweden

This group built on a developing breadth of experience characterizing histopathologic changes in renal biopsies of CKDu patients. Consistencies in the features of these biopsies may offer clues to potential etiologies and pathogeneses that might be exploited to mitigate risk of disease or disease progression in patients, agricultural workers and their families. This working group brought together scientists with experience reviewing patient biopsies with scientists who experimentally investigate xenobiotic-induced renal disease. The aims were to build a global partnership of renal pathologists and scientists, align on key pathologic features of this unique disease, speculate on pathogeneses, and develop a descriptive schema and protocol for biopsy

characterization. Participants also engaged clinical scientists to discuss clinical protocols for early identification of patients with developing disease, approaches to patient monitoring to increase the understanding of disease progression, and identification of potential areas for experimental investigation.

Morning Sessions

Optional morning sessions[2] were available for all workshop participants and most included bilingual presentations or simultaneous translation.

- **Heat exposure assessment for epidemiology studies**, led by Dr. Vidhya Venugopal, Sri Ramachandra University, India; Dr. Daniel Rojas, Universidad Nacional, Costa Rica; Dr. Andrés Robles, SALTRA, TEC, Costa Rica
- **Epidemiology study design**, led by Dr. Ben Caplin, University College London; Dr. Marvin González-Quiroz, Research Center on Health, Work, and Environment (CISTA)/UNAN-León, Nicaragua
- **Pesticides and Agrochemicals Exposure Assessment**, led by Dr. Aurora Aragon, CISTA UNAN-León, Nicaragua; Dr. Katherine James, University of Colorado-Anschutz Medical Campus; Dr. Alison Sanders, Icahn School of Medicine at Mount Sinai; Dr. Andres Cardenas, University of California, Berkeley; Dr. Lesliam Quiros-Alcala, University of Maryland
- **Update on Biomarkers of Renal Function**, led by Dr. Carl-Gustaf Elinder, Karolinska Institutet, Sweden
- **Ethical Considerations in CKDu Research**, organized by Dr. Agnes Soares and Dr. José Escamilla of PAHO, with a presentation from Costa Rican bioethicist Mr. Jorge Villalobos Alpízar

Morning training sessions were held for new researchers as well as experts. Dr. Carl-Gustaf Elinder (Sweden) led a session on biomarkers.

Policy Session

[2] The first three sessions listed were designed as introductory sessions for trainees and researchers who do not have prior experience on the topic. The last two sessions in the list were designed for all workshop participants.

The policy session was intended as a space for discussion about the potential implications of research findings and workshop conclusions for intersectoral public policy decisions in CKDu-impacted countries. It provided a platform to learn from regional and national mechanisms of policy-making processes, and to explore how researchers and policy makers from different sectors could play a role in those processes. While recognizing that each country has its own dynamics and contexts that affect policy-making related to CKDu, this session was designed to discuss the opportunities presented by existing national and international technical and political integration mechanisms where the workshop conclusions could be presented, translated, and incorporated into public policy making.

During the policy session, Dr. Olivia Brathwaite, PAHO Subregional Adviser for Non-Communicable Diseases for Central America and Dominican Republic presented an overview of the intersectoral response to CKDu in Central America. Intersectoral represented actions of government, private, non-profit organizations, and other entities outside of the health sector that may impact CKDu-related policy and public health action.

The session included presentations from the following:

- Dr. Denis Angulo Alguera, Vice-minister of Health in Costa Rica
- Dr. Asela Iddawela, Project Director of the Presidential Task Force on Prevention of Chronic Kidney Disease, Sri Lanka
- Dr. Olivia Brathwaite, PAHO Subregional Adviser for Non-Communicable Diseases for Central America and Dominican Republic

Costa Rica´s Vice-Minister of Health opened the session with a welcome and announced that legislation had just been signed regarding a case definition for CDKu that will allow for official CKDu surveillance soon. Opening comments were followed by presentations and a panel discussion moderated by Olivia Brathwaite. Jennifer Crowe and Agnes Soares served as coordinators of the session.

Scientific Summary

On the final day of the workshop, each working group participated in a plenary session to summarize their work and preliminary conclusions. Dr. Ricardo Correa-Rotter, a member of the organizing committee and CENCAM co-chair, gave a scientific summary of the meeting, reiterating the key points made in the final working group presentations and work in progress across researchers. These conclusions will be summarized in a later report.

The last day of the workshop included a scientific summary by CENCAM president, Dr. Ricardo Correa-Rotter (left) and a panel with presentations from all working groups as well as WHO and NIH, led by Dr. Bonnie Joubert of NIEHS (right).

Collaboration

A panel discussion on collaboration and cooperation took place on the final day of the workshop, to discuss the successes and barriers in collaborative studies on CKDu and potential next steps. The panel included one representative from each working group, WHO, and NIH. Panelists and audience members were encouraged to think creatively, beyond financial restrictions, regarding what could be considered in collaborative research agendas. An example question was posed, "If money is not an issue, what would you prioritize for collaborative research, with the ultimate goal of reducing CKDu?" Big picture considerations as well as smaller scale research priorities were discussed. Some discussion points are noted below. As with the World Café discussions, this is not a comprehensive list, nor does it represent consensus across participants.

- Improve and standardize exposure assessment across studies
- Promote the use of harmonized core questionnaires in epidemiological studies
- Identify early characteristics of disease and conduct extensive follow up of patients to better understand clinical trajectories
- Strengthen government CKDu public health surveillance tied to healthcare access for patients, and to known occupational and environmental risks
- Continue the network of CENCAM and partners

More detailed points also covered expanded surveillance, interventions, pathology studies, and additional omics data in epidemiology studies. Some of the barriers to collaboration raised in the discussion included competition across scientists for publications; the diversity of CKDu across affected countries; coordination across institutions and agencies; language barriers; and limited resources in affected communities. Studies of the disease are likely impacted by confounding and bias which need to be planned for, and causality is challenging to establish. However, despite these challenges, it was expressed that researchers should not hesitate or aim for a perfect study design. Rather, intervention, research, and policy efforts are needed now.

Posters

Forty-two poster presentations displayed recent progress on current studies and plans for future work. Full abstracts are included in the meeting book available on the workshop website. Poster presentations facilitated leadership opportunities for many trainees and stimulated ongoing discussions across all workshop participants.

Posters demonstrated the most recent work available including ongoing (unpublished) studies from across the globe.

Conclusions

Key accomplishments from this workshop included the positive face-to-face interactions in small and large group settings and the productive working group efforts on focused science areas. CKDu remains a major public health crisis. The lives that have been lost and the toll on families and communities have not subsided, despite gains in research, public health, and clinical efforts over the last decade. The second international workshop on MeN report [4] noted a high priority for coordinated regional approaches to study prevalence, etiology, and evaluate interventions. These priorities remain moving forward from the 2019 workshop.

New to the 2019 workshop was a working group focused on pathology. Participation also included experts in toxicology that have not yet been involved in prior CKDu workshops. Researchers working with established investigators are expanding work to include novel and integrated approaches. With these new alliances, it is important to recognize and learn from the researchers and clinicians who have been in place and working with impacted communities for decades. It is also vital for established or veteran researchers to be open-minded to change and collaboration with those bringing new energy and perspectives to the issue.

Expected Products

A technical report of the workshop will be web-published in the SALTRA series, just as the reports from the previous workshops, and on the CENCAM web site. Subsequent scientific publications, either as a special issue or stand-alone, are also foreseen depending on interest from the working groups.

An evaluation of the meeting was circulated with participants to provide anonymous feedback which will help in the planning of future events. The content covered likely stimulated new ideas for existing research projects as well as new projects including collaborative efforts across those participating at the meeting and those who were not able to attend in person. Optional sharing of posters was facilitated for those interested by circulating a combined PDF of all shared posters with participants after the meeting.

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