

Title: Safeguarding the future of Urological research and delivery of clinical excellence: harnessing the power of youth to spearhead Urological research

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Research has a key role in driving the specialty forward and improving the care of our patients. However, conducting large multi-centre studies can be extremely challenging. As an individual surgeon, it is difficult to gather the appropriate methodological, administrative and financial support to run them or have the time to do so. Driven by novel forms of electronic communication, one solution to this problem are resident-led research collaboratives, typified by that of the British Urology Researchers in Surgical Training (BURST), Australian Young Urology Researchers Organisation (YURO), Young Academic Urologist section of the European Association of Urology (EAU) and Young Urologic Oncologists (YUO) section of the Society of Urological Oncology. Whilst resident-led collaboratives have achieved success in other surgical specialities, they have only been gathering attention within Urology in recent years (Table 1).

Resident-led research collaboratives provide a central network of expertise in methodology, mentoring and knowledge of research processes. The committee of such organisations are typically comprised of residents or junior Urologists with close support from senior academic Urologists and clinical trials groups. Clinicians with ideas for research projects can present ideas to the collaborative who provide a detailed peer review, modify the protocol to make the design more robust, before assessing feasibility to roll out the study amongst their vast network of interested collaborators. The collaborative can carry out time-consuming approvals required to run the study, creates databases for data entry and provides the administrative resource to coordinate and run the study across many different centres.

A fundamental principle is that residents take the lead in coordinating the study and collecting data at individual sites under the supervision of a local consultant. Contributors are recognised with PubMed-indexed collaborative authorship. Each resident is only required to obtain data for a small number of patients, which gives them a very achievable goal but between many residents this scales up exponentially to make a well-powered study that recruits quickly. An excellent example of this would be the Multi-centre cohort study assessing the role of Inflammatory Markers in spontaneous stone passage In ureteric Colic (MIMIC), which had 220 collaborators across 71 sites collecting data for 4181 patients in 7 countries over a 4-month period, concluding that white cell count did not influence the likelihood of spontaneous stone passage in patients with acute renal colic [1].

One interesting aspect about this approach is that residents often have fewer conflicts of interest than their seniors and can be more flexible in their views meaning they tend to have reasonable equipoise when considering study designs or recruiting patients to a study (Table 2). This may allow the conduct of studies in areas of Urology that it might otherwise be difficult. The geographical flexibility provided by residents who are spread over regions allows access to a wide range of different practices which can increase the generalisability of the results and provide large samples sizes that are powered to investigate associations and disease areas that may otherwise be difficult to. Types of research projects that work well within resident-led collaboratives are observational cohort studies [1, 2], case-control studies [3], systematic reviews [4-6], meta-analysis [7], and randomised controlled trials [8-10].

Challenges of this approach include the lack of dedicated managerial infrastructure to coordinate large numbers of clinicians across different geographical areas. Open-source software such as Slack, social media platforms such as Twitter and meeting forums provided by organisations such as the European Association of Urology and British Association of Urological Surgeons help to mitigate this issue. Set up of clinical trials-compliant databases for data collection can be done with software such as Redcap which gives clinicians anywhere at any time access to a robust electronic data entry system. Systematic reviews can be aided by Cochrane endorsed-software such as Covidence which has enabled reviewers in different time zones to collaborate together easily.

Engagement with residents and consultants may be variable at first until they are convinced that the concept works. As a result, lower-risk projects such as cohort studies in areas of a common pathology with short-term outcomes that can be easily run in most centres and study designs such as systematic review are often used to consolidate the network in the early stages of a collaborative. Typical areas of investigation here include stone disease, treatment of lower urinary tract symptoms, bladder and prostate cancer management.

Support from established senior surgeons who are recognised in their units, region or country is essential for this model to have success. Obtaining funding can be challenging but one of the advantages of the collaborative approach is that within the network there are usually technology-savvy residents who are able to contribute project infrastructure, specialist IT and database skills that would otherwise be expensive to fund. Funders are now beginning to recognise the potential that these networks have in successfully delivering clinical studies and large grants have been awarded to resident-led collaboratives for the delivery of randomised studies of surgical interventions with longer-term follow up [8-10].

One of the key reasons for success of this model is the motivation of residents to be part of something that is not only successful and high profile but enhances their portfolio at a point in their careers where esteem is important. Residents gain transferrable team-working skills and specific research methodology skills. They learn how to critically appraise the literature, to write a protocol, to gain governance approvals for projects, to recruit patients to studies, to analyse data, to write scientific papers and to present the findings. Thus, this provides the consultant workforce of tomorrow with the skills required to deliver practice-changing clinical studies in Urology. There is the potential that these collaboratives could drive the “everyone as a researcher” mentality in which there is the possibility that every surgical patient could be offered a trial or the opportunity be involved in a clinical study that can improve patient care. In summary, resident-led collaboratives offer exciting new perspectives and approaches to Urological research and time will tell whether they have the potential to deliver on their early promise.

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Table 1: Examples of Resident-led research projects in Urology and allied surgical specialities with contact details of collaboratives

Study	Collaborative	Study design	Status	Findings
Multi-centre cohort study assessing the role of Inflammatory Markers in spontaneous stone passage in ureteric Colic (MIMIC) [1]	British Association of Urological Surgeon's in Surgical Training (BURST) www.bursturology.com Twitter: @BURSTUrology Email: bursturology@gmail.com	Retrospective cohort study n = 4181	Complete	White cell count was not associated with likelihood of spontaneous stone passage. Key predictors were stone size and stone position.
The Investigation and DEtection of urological Neoplasia in paTlents reFerred with suspected urinary tract cancer: A multicentre anaLYsis (IDENTIFY)	British Association of Urological Surgeon's in Surgical Training (BURST) www.bursturology.com Twitter: @BURSTUrology Email: bursturology@gmail.com	Prospective cohort study n = 5000	Pilot study in 800 patients complete. Main study open to registration.	Multi-centre prospective study feasible. Progress to main study phase.
International Post-operative Intravesical Chemotherapy study (IPIC)	Australian Young Urology Researchers Organisation (YURO) http://ausyuro.wixsite.com/yuro Twitter: @AusYURO Email: ausyuro@gmail.com	Prospective cohort study n =	In set up	In set up
Global minimally invasive pyeloplasty study in children: Results from the Pediatric Urology Expert Group of the European Association of Urology Young Academic Urologists working party [2]	Young Academic Urology (YAU) Section of the European Association of Urology http://uroweb.org/education/young-urologists-office-yuo/yau/ Twitter: @EAUyAUrology	Restrospective Cohort study n = 575	Complete	Shorter hospitalization time and lower postoperative complication rates with robotic pyeloplasty compared to laparoscopic approach in treating ureteropelvic junction obstruction in children.
Use of XenX, the latest ureteric occlusion device with guide wire utility: results from a prospective multicentric comparative study [3]	Young Academic Urology (YAU) Section of the European Association of Urology http://uroweb.org/education/young-urologists-office-yuo/yau/ Twitter: @EAUyAUrology	Prospective case control study n = 82	Complete	XenX was a safe and effective device for the treatment of upper ureteric tract stones; It may reduce the risk for the need of auxiliary procedures and for the insertion of a JJ stent.
Gleason 6 Prostate Cancer: Translating Biology into Population Health [5]	Young Urologic Oncologists (YUO) Section of the Society of Urological Oncology http://suonet.org/y-u-o.aspx Twitter: @SUO_YUO Email: info@suonet.org	Systematic review	Complete	The metastatic potential of contemporary Gleason 6 disease is negligible but not zero.
Sensitivity, Specificity, and Predictors of Positive 68Ga–Prostate-specific Membrane Antigen Positron Emission Tomography in Advanced Prostate Cancer: A Systematic Review and Meta-analysis [7]	Australian Young Urology Researchers Organisation (YURO) http://ausyuro.wixsite.com/yuro Twitter: @AusYURO Email: ausyuro@gmail.com	Systematic review and meta-analysis	Complete	For biochemically recurrent prostate cancer, there is a favourable sensitivity and specificity profiles compared to choline-based PET imaging techniques
Randomized controlled trial: Reduction of Surgical Site Infection using a Novel Intervention (ROSSINI) [8]	West Midlands Research Collaborative (WMRC) http://wmresearch.org.uk Twitter: @WMRC_UK enquiries@wmresearch.org.uk	Randomised controlled trial n = 760	Complete	Wound edge protection devices did not reduce surgical site infection rate when used during laparotomy
A randomized controlled trial of reinforcement of closure of stoma site using a biological mesh (ROCSS) [9]	West Midlands Research Collaborative (WMRC) http://wmresearch.org.uk Twitter: @WMRC_UK enquiries@wmresearch.org.uk	Randomised controlled trial n = 560	Internal feasibility complete. Main study recruiting	Multicentre randomization to this trial of biological mesh was feasible, with no early safety concern. Progress to main study phase

Table 2: Advantages and limitations of resident-led collaborative research

Advantages	Limitations
Methodologically robust studies due to peer-review process	Engagement of residents can be variable until the concept has been shown to work
Large sample sizes achievable by distributing over collaborative network	Engagement of established Urologists can be challenging as they may be unfamiliar with the concept
Studies can recruit and complete quickly	Central coordination is required and takes time to set up in the absence of a dedicated managerial infrastructure
Studies can be more generalizable as patients are from a wide range of centres	Challenging to design explanatory trials when such a large number of sites are involved
Can investigate rare diseases	Easier to successfully deliver studies in areas with of a common pathology
Efficient and cheap as the collaborative utilises expertise within existing network	Complex interventional studies are challenging to deliver and big funding is still required for success of the study
Residents have fewer fixed views and fewer conflicts of interest, thus priority is on studies that may improve patient care	Individual units may have biases which limit involvement in a collaborative study
Residents gain transferrable team-working skills important for career	Transferrable skills gained are dependent on how well the team functions
Residents gain specific research skills equipping them to run clinical trials as consultants	Research skills gained are dependent on the expertise level within the collaborative network
Residents and consultants are recognised for their contribution with authorship on PubMed indexed peer-reviewed papers	Not all national training bodies will recognise collaborative authorship