

SIMULATION-BASED EDUCATION IN ALLERGOLOGY TRAINING: A SOUTH AFRICAN PERSPECTIVE

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SUMMARY

In the past two decades, simulation-based education has moved medical teaching out of the lecture rooms, wards and emergency departments by creating a safe environment that provides the learners with life-like experiences, while shielding patients from novices' potentially unsafe medical practices.

Developing a curriculum based on simulation is a complex process that involves the acquisition of infrastructure and equipment as well as the employment of qualified personnel and faculty in order to support the training programme. Learning objectives are achieved by running simulated case scenarios followed by debriefing. The cases must be both realistic and relevant to the learners' practice area to motivate self-driven learning and, at the same time, to provide state-of-the-art training to the required competency standards. Debriefing through various techniques, such as the advocacy-and-inquiry with 'good judgement' approach is an essential component of the educational experience, focused on the learning phases of description, analysis and application of newly-acquired knowledge and skills.

Simulation-based education is particularly useful in fields of medical practice such as allergology, where trainees are not routinely exposed to critical cases and where communication skills are essential for successful chronic disease management through the development of a solid relationship between the medical team and the patient.

Motto: 'Knowing is not enough; we must apply. Willing is not enough; we must do.' - Johann Wolfgang von Goethe

INTRODUCTION

Simulation-based education is recognised worldwide as an important teaching tool to be incorporated in the training of all healthcare professionals and across all medical specialties in order to improve the quality of care and patient safety.¹ Simulation allows for the 'deconstruction' of complex scenarios into simple tasks and for the application of new knowledge and skills in an environment where making mistakes is permissible, and the old 'learning through trial and error' adage is the norm, rather than a dangerous practice.^{2,3} The extensive use of this powerful training tool has changed the traditional educational paradigm in acute and critical care. This is also the case in surgery, where trainees are required to have 'hands-on', repetitive experiences, before being allowed to practise on patients.³ In these areas, simulation effectively facilitates the journey of a novice to the stage of medical expert without compromising patients' safety. However, other medical disciplines such as allergology may use

simulation to enhance the trainees' learning experiences and ultimately improve the quality of healthcare. This article reviews the theoretical basis for simulation-based medical education and analyses possible frameworks for introducing this tool into the allergology training curriculum.

FOUNDATIONS OF MEDICAL SIMULATION: LEARNING THEORIES AND IMPLEMENTATION SCIENCE MODELS

Medical simulation educationalists focus on translating and implementing into medical practice evidence-based multidisciplinary theories, models, principles and methods such as business development, institutional management, psychology, error analysis, and even industrial engineering, to improve the quality and effectiveness of healthcare.^{4,5} This approach of integrating the 'implementation science' (IS) into medical training facilitates the transfer of knowledge and the understanding of complex medical concepts. IS should result in an improvement in trainees' attitudes and problem-solving skills.⁶

The IS models may be used in simulation-based medical training to identify and pro-actively address performance gaps and barriers to implementation of learning, thereby

promoting positive change in key competencies and behaviours.^{6,7} In addition, standardised methodology translated through the integration of IS in simulation-based training is used in assessment for the purpose of professional certification and licensing by several major accrediting bodies in the United States, Canada and the United Kingdom, such as the Accreditation Council on Graduate Medical Education (ACGME),⁸ the Accreditation Council on Continuing Medical Education (ACCME),⁹ the American Board of Medical Specialties (ABMS),^{10,11} the Royal College of Physicians and Surgeons of Canada,^{12,13} and the United Kingdom's General Medical Council.¹⁴

Current learning theories of individual change are incorporated in modern simulation-based medical education. This is a pro-active, intentional process, which depends on specific attitudes, perceptions, expectations that drive the learners' motivation and lead to reasoned action and planned behaviour.^{15–17} However, when simulation is used in undergraduate training, effective teaching may be based largely on a non-negotiated curriculum that may promote change even when students are not yet aware of what cognitive or behavioural changes are needed for them to become competent medical professionals (the transtheoretical model).¹⁸

The Precede/Proceed model¹⁹ is another theoretical framework used in simulation. This model is aimed at reinforcing the learner's previous experiences before introducing new skills and competencies. The Pathman model²⁰ proposes customised education through negotiation with the individual adult learner, aimed at achieving mutually agreed objectives leading to long-lasting, self-driven practice changes.²⁰ Cognitive psychology strategies,^{22–24} such as the enunciation of a general principle followed by multi-angled examples, redundant teaching and feedback, post-experiential reflection are widely used in simulation to increase the transfer of learning into practice.^{24–26}

As a tool for system or team performance assessment in simulation-based training programmes, force-field analysis²⁷ has been used to identify a system's strengths and vulnerabilities by assessing the trainees' responses in simulated high-stake situations.¹⁵ This approach may be used on a large scale, with the purpose of actively changing the healthcare culture and improving patient safety.²⁸ This model, applied in conjunction with the other IS tools, is especially valuable when the targeted outcome is the ethical and competent functioning of the individual learner within a team and within the healthcare system as a whole.²⁹ It is also used to build clinical resource management and leadership skills, as well as the capacity of the individual learner to identify, analyse and prevent medical errors.^{30,31} Another error analysis model, which can be used in simulation debriefing, is the Ishikawa 'fishbone' diagram.³⁷ This 'root cause' analytical tool is a structured, team brainstorming process, seeking

to identify positive and negative inputs (institutional policies, standardised operating protocols, infrastructure, equipment and materials, people and the environment) that led to a certain outcome.^{37–38} Framework analysis, originally developed in the field of social policy research, has been incorporated in debriefing to improve the learners' and stakeholders' understanding of 'actionable outcomes', such as medical errors in acute care, for the purposes of proposing educational interventions to change behaviours and improve patients' safety.^{32–36}

All these IS theories are applied in designing simulation-based medical education curricula and in measuring the impact of the subsequent change on the overall competencies required for safe and efficient medical practice.³⁹

SIMULATION AS A POWERFUL LEARNING TOOL IN MEDICAL EDUCATION AND ALLERGY TRAINING

Simulation is lessening the inherent risks of allowing the trainees to learn through 'trial and error' and makes medical teaching more ethical, bringing it in line with the basic tenet of medicine: 'first do no harm'.¹ The ethical principle of non-maleficence ought to prevent novices from interacting with patients before they have perfected their skills to a degree that ensures patient safety. Trainees need the close supervision of specialised staff, which may be insufficient to ensure an acceptable level of patient safety. In addition, the overwhelming need to place the patient's wellbeing at the centre of medical care may result in more time spent with exclusive patient care, especially in emergencies, at the expense of the time available for teaching trainees.¹ Therefore, simulation-based teaching offers a controlled environment, where inexperienced trainees are able to learn from their own mistakes and achieve a competency level that ensures safe medical practice before their interaction with the patients. In addition, simulation is useful for the more experienced practitioners who wish to maintain their competencies and perfect or learn new skills.

The benefits of simulation are obvious especially in high-risk areas of medical practice with an increased incidence of medical errors, by providing a safe framework that enables trainees to analyse incidents leading to adverse outcomes and to identify latent safety threats within the healthcare environment.⁴⁰ These competency requirements apply across medical specialties and are the main criteria in the evaluation of the quality of medical training for programme accreditation and certification purposes. Training programmes in Basic Life Support (BLS), but also Advanced Life Support (ALS) courses, such as Advanced Cardiovascular Life Support (ACLS) and Pediatric Advanced Life Support (PALS), expose the learners to simulated emergency cases within a safe environment. These programmes facilitate the development of an ethical approach to patient care,

efficient team work, closed-loop communication skills, accurate patient assessment, rapid management of most frequently encountered life-threatening causes of respiratory and cardio-respiratory arrest.^{41,42} Repetitive use of simulated case scenarios, followed by appropriate debriefing, has proved to be more efficient in improving not only the purely cognitive and technical aspects of practice, but also the clinical reasoning process. In addition, the transfer of durable knowledge and skills into the real practice environment is more effective and more likely to prevent errors, compared to standard teaching.^{43,44}

Simulation becomes particularly helpful when healthcare professionals, including allergology practitioners, are rarely exposed to emergencies and need to maintain or refresh their competency in managing life-threatening cases in tension-filled, complex situations.⁴⁵ This can be achieved through the creation of realistic and relevant scenarios that challenge the allergology practitioners and are designed to improve their capacity to deal efficiently and appropriately with life-threatening emergencies.^{45–47}

As compared with traditional teaching methods, simulation-based education promotes standardised learning by repetitive experience, observation and reflection.^{1,48,49} One of the most challenging tasks for traditional clinical medical teachers is to plan and structure their learning sessions with patients relevant for the learning objectives. Not only is the recruitment of the patients difficult, but their availability may often not coincide with learners' or teachers' schedules.⁵⁰ This results in a lack of uniformity to clinical exposures and unfairness in terms of unequal learning opportunities and preparedness for summative, high-stake assessments. Besides the qualitative and quantitative inequality in the learning experiences, involving real patients as a teaching resource raises critical ethical issues related to their autonomy and safety, especially when they are vulnerable.⁵⁰ Standardised patients (SPs) played by trained actors or the use of virtual patients (online models or mannequins) provide a fair and safe environment for teaching and assessment.^{1,50,51}

In allergology training, simulation provides a safe environment for learning technical skills, such as epinephrine administration, intravenous and intraosseous fluid administration, airway management, through repetitive practice.

In addition, simulation based-education is appropriate for teaching and assessing professionalism and for training healthcare workers in effective, patient-centred communication.^{1,51,52} Insofar as the diagnostic and management of allergic disease are concerned, an accurate, comprehensive history, which is focused on certain must-not-miss, generally applicable signposts, is necessary for developing a meticulous action plan, tailored to each individual patient's case. As with any

chronic conditions, a close relationship of trust needs to develop between the allergology practitioner and the patient to ensure monitoring and good compliance with the medication. Therefore, when employing simulation for procedural skills or clinical management training, it is necessary to add a communication dimension to the case scenarios, and perhaps also involve trained SPs to aid in the improvement of communication skills.

Allergology practices are usually heterogenic, involving people with diverse backgrounds and professional experiences, and good communication is essential for a successful collaboration between team members. This is particularly important in life-threatening emergency situations, where good knowledge of protocols and well-coordinated team work were shown to improve patient outcomes,¹ therefore team work on various possible clinical scenarios may enhance the overall quality of performance, optimise the use of individual skills, improve communication and relationships, and ultimately ensure better patient care and safety.

At the same time, realistic, relevant simulated case scenarios may be used to enforce certain qualities that are always embedded in the 'hidden' medical curriculum such as honesty, openness, fairness and empathy.¹

In addition, simulation is a powerful educational tool for management and leadership skills training, including environment awareness, error analysis and remediation, resource allocation, crisis control and conflict resolution.¹

Health advocacy is critical in allergology practices, where patient education and cooperation are central to the successful treatment of allergic disease and prevention of allergic emergencies. Case scenarios specifically designed for patient education may assist in the creation and enforcement of behaviours that ensure good control of the baseline illness, as well to model the rapid sequence of symptom recognition and response in life-threatening emergencies, such as calling for help and epinephrine administration in anaphylaxis.

However, with all its advantages, when it comes to implementing a quality simulation programme in practice, there are many hurdles, especially in respect of finding the necessary financial and human resources. These pitfalls will be discussed in more detail in the context of the possible development of a simulation model for allergy training, based on Kern's approach to curriculum development.⁵³

DEVELOPING A SIMULATION-BASED MODEL FOR ALLERGY TRAINING

In the United States, medical training is inconceivable without a simulation programme embedded in the curriculum of all medical schools.⁵⁴ Major universities such as Harvard

have developed large, interdisciplinary Simulation Centres that function autonomously from the medical schools and service a large array of medical professionals from the United States and abroad. The Simulation Centres appoint staff capable of aiding the medical schools and residency programmes with designing simulation-based curricula and simulation staff training. A similar approach has been adopted in Australia, Canada, Europe and the United Kingdom. Whether part of medical schools or affiliated to non-profit organisations- or hospitals, medical simulation centres have promoted a radical change in traditional educational paradigms.

From the experience reported by various programmes, the process of implementing a simulation-based medical curriculum involves several critical steps, adapted from Kern's approach to curriculum development.⁵³ The initial stage involves the problem identification and a general needs assessment, followed by the recognition of the targeted learner's needs assessment. The next step is setting out the programme's goals and objectives, followed by choosing the educational strategies to be adopted and the implementation of those strategies. Thereafter, there is a never-ending process of evaluation, adjustment and re-evaluation that ensure that the curriculum is at all kept times aligned with the identified needs, learning objectives and outcomes.

GENERAL AND TARGETED NEEDS ASSESSMENT

The paradigm shift towards replacing the traditional bedside teaching with simulation would be difficult without a persuasive presentation of the reasons for change. The process of assessing the relevance of a new simulation-based medical education programme to evaluate the benefits and drawbacks of moving away from the classic model, which uses actual patients for teaching clinical skills. In this context it may be argued that, taking into account all the various potential uses for simulation in promoting experiential teaching and learning in various medical systems, the movement towards replacing real patients with computerised mannequins or trained actors to educate medical novices is justified by not only by professional ethics, but also by versatility, efficiency and efficacy considerations.

While allergology practitioners at all levels are required to competently manage severe allergic diseases, such as anaphylaxis, angioedema and asthma, they are not routinely exposed to extreme situations. For many, unexpected emergencies are unfamiliar or even frightening. In this case, simulation may aid in the periodic refreshing of knowledge and practise of skills that increase the competence and confidence to act in critical situations.⁵⁴ The clinical management of life-threatening emergencies is taught most efficiently and effectively in a safe environment that allows for the reinforcement of concepts and repetition practical skills until the competency level is sufficient for

actual patient interactions. In addition, the unique core communication skills that are at the root of an accurate diagnosis of allergic disease and ensure the appropriate patient-centred management and compliance monitoring are best taught through repetitive, standardised interviews with trained actors, followed by debriefing.

Another targeted group for simulation training in allergy may be the patients themselves, their families and school staff, since many severe allergies occur in the community and valuable time is wasted because bystanders are unable or not competent to administer life-saving treatment, such as epinephrine.

Therefore, an intervention directed at these groups will contribute to effective staff and public training in emergent allergic disease.

THE CURRICULUM BLUE-PRINT

Instructional design

An essential stage in the process of curriculum planning is focused on the identification of the learning goals and objectives of the course which must be in line with the general and targeted needs and, more specifically with the professional competencies defined by the authorised accreditation bodies.⁵³

The strategies and methods for curriculum delivery in medical education must be appropriate, effective and efficient in meeting the specific requirements of the healthcare system, organisation and learners. The overall instructional design will depend on the level of learner and the targeted field of medical practice. Regardless of the educational strategy chosen, the success of curriculum delivery will depend on the congruence between the instructional design and the learning objectives.^{54,55}

In the field of emergency medicine, technology-enhanced simulation, using mannequins, partial task trainers and other educational tools, was found as effective as traditional teaching methods in terms of knowledge acquisition, skill product, learner behaviour and effect on patient outcomes, its success relying significantly on the type of instructional design chosen to deliver the curriculum.^{3,42,54–56} An innovative instructional design in acute-care training is the 'Emergency Medicine Milestones', based on the 'mastery learning model', where the learners have to achieve a certain level of competency in more basic procedures before moving on to the next, more complex or difficult tasks.^{3,57,58} This approach allows for an objective evaluation of the learners' progress and makes possible the early identification and remediation of those who have failed to comply with a set of cognitive, behavioural and procedural requirements.⁵⁸ Furthermore, scenario repetition and the type of feedback or debriefing given during, or after the simulation session was found to significantly influence the learning outcomes. In procedural skills, closed supervision

and feedback provided using the 'pause-and-perfect' model improved performance and self-efficacy.^{57–60}

The most important principle in incorporating simulation in the allergy training programme is to employ the most efficient teaching strategy to effectively achieve the learning objectives. The simulation sessions could focus either on acquisition of simple technical skills (intramuscular or intravenous epinephrine administration, rapid sequence intubation, skin-prick testing), non-technical skills (teamwork, leadership and communication) or overall patient interview, examination and management.

Use of simulation for formative and summative assessments

Medical education institutions and professional accreditation bodies consider simulation to be both a training tool and an instrument for competency assessment.⁶⁰ The assessment objectives, criteria and checklists must be aligned with the curriculum and adequate in terms of validity, reliability and general efficacy in evaluating performance.^{60–62}

Instructional design signposts in simulation-based education: development of simulated cases and debriefing

Embedding simulation-based education in medical curricula involves the development of a 'case-scenario bank' that fulfils the all-important criterion of meeting the course's learning objectives. The cases must be both realistic and relevant to the learners' practice area.⁴⁴

Pre- and post-simulation debriefing is an essential component of the learning experience and must be done skillfully, if the learning objectives are to be achieved and retained, while at the same time maintaining learner curiosity and motivation.^{63–64} Modern debriefing methods, such as the 'debriefing diamond' used at the Simulation and Interactive Learning Centre and the King's Learning Institute, King's College London,⁶³ or the 'debriefing molecule' used by the Harvard Medical School Associated Center for Medical Simulation,⁶⁴ are based on the learning phases of description (knowledge), analysis and application, and are focused on the advocacy-and-inquiry with 'good judgement' approach.⁶⁴ The learning objectives targeted by debriefing are related to the development of non-technical skills, such as leadership, collaboration and task-prioritising.^{63,64}

IMPLEMENTATION AND RESOURCES

The shopping list for establishing and maintaining a simulation training course could become expensive, which is one of the main drawbacks of using simulation in education. Nevertheless, solutions may be found when efforts are made to establish corporate partnerships or collaborations with other programmes, which facilitate sharing and exchanging facilities and equipment. Demonstrating a good 'return on investment' (ROI) and

a positive change in patient safety is key to gaining acceptance of a simulation programme by the various stakeholders.³⁹ Rigorous feasibility studies are necessary to gauge the actual ROI when using simulation versus traditional training.

In this context, it may be argued that, given the high prevalence of allergic disease in South Africa, improving the quality of care offered to the affected patients through systematic training of healthcare professionals at all levels may be as much a priority as is the management of tuberculosis (TB) or HIV/AIDS.⁶⁵ Better diagnosis and management of allergic disease may result in a significant reduction in medical expenses and may decrease the incidence of preventable allergy-related deaths.

Infrastructure: "in-situ" simulation versus "off-site" simulation centres

Training 'in context' has proved to improve the quality of medical education, including retention of knowledge. Dedicated premises, whether within hospitals, medical schools or autonomous simulation centres, are meticulously designed to specifically organised areas that reproduce emergency rooms, wards, operating theatres and even radiology departments. Major hospitals affiliated with the Harvard Medical School in Boston have built up their own simulation centres, separate from the clinical premises. Other simulation programmes function from hospital premises in standardised rooms that are separate from the clinical patient care circuit. The 'in-situ' simulation is cheaper, easily accessible, comfortable, realistic, tailored according to the institutional needs and in an environment familiar to the learners. Training takes place in the vicinity of patients and their families, who are therefore reassured that the staff practises and trains regularly. On the other hand, the disadvantage is that patients lack privacy, may witness incidents that may cause them anxiety or discomfort, and may be exposed to safety risks such as accidentally using simulation equipment and materials. In addition, there are other disadvantages such as the difficult construction and maintenance of a safe environment for 'learning by trial and error' or the risk of interruption with requests for other work-related tasks.⁶⁶

Technology and materials

Depending on the purpose, different simulation tools may be used with comparatively similar efficacy. The equipment available in the simulation market ranges from simple, low-tech or part task simulators to complex task trainers and realistic, high-fidelity patient simulators. Simulation programme creators and managers must evaluate various types of simulation equipment and method to achieve the learning objectives at the lowest cost.^{3,67} In allergy training, learners may benefit from hybrid simulations, where a standardised patient provides the history and allows for the physical examination, while being attached to a simple task trainer, such as an airway management mannequin,

a lower limb for intramuscular epinephrine administration or intraosseous infusions, or an arm for intravenous fluids and medications.⁶⁸ Low-cost mannequins may not reproduce identically the relevant human structures, and often realism is difficult to achieve with task trainers, even in hybrid simulations. However, simulation is as close as one can get to practising new skills for the first time – short of experimenting them on a real patient.

Faculty and faculty training

Worldwide, as simulation-based training is increasingly used as tool in medical education programmes, there is a parallel increase in the need for appropriately skilled teachers.^{69–72} Several training programmes for simulation instructors and technicians are in place in Australia, Canada, Spain, the United Kingdom and the United States. In the United States, the Society for Simulation in Healthcare sets out the standards for the certification of the Healthcare Simulation Educator.⁷³

Medical simulation instructors need to develop expert-level skills in important areas, including curriculum development, evaluation and adaptation; designing and running realistic, effective and standardised simulated cases followed by an efficient and effective debriefing process, based on the learning objectives; insightful formative assessments and reliable, fair summative assessments and research aimed at improving the outcomes of medical education.^{69–72} Ultimately, their selection and training are critical, having an important impact on the effective standardisation of simulation programmes, as well as on the way the programme is perceived by the learners.^{52,72,73}

However, training simulation experts is expensive and time consuming. Where there is already a shortage of human resources in healthcare, removing clinical staff from patient care for training in simulation may not be an option. Therefore universities and hospitals in developing countries such as South Africa may have difficulties in setting up formal simulation instructor training programmes to regulate the certification of simulation educators and thereby ensure adequate professional standards. While collaborations with international instructor training programmes may be an alternative option, this is also not cheap and may not be necessarily tailored to the needs of the local healthcare stakeholders.

MECHANISMS FOR EVALUATION OF THE TRAINING PROGRAMMES

Kirkpatrick proposed a four-level conceptual model for curriculum evaluation, based on learners' participation or reaction to the educational experience, the degree of modification of attitudes or perceptions, modification of knowledge and (or) skills, and ultimately the transfer of the changes to the workplace.⁷⁵ This process takes place on an ongoing basis, closing the curriculum development loop, while at the same time leading to adjustments that address

the gaps and adapt the content accessed at and methods to the changes in healthcare and learners' needs.⁷⁶

CONCLUSION

In the past two decades, simulation moved medical education out of the lecture rooms, wards and emergency departments by creating life-like experiences that improve knowledge and facilitate the learning of behaviours and skills, while shielding the patient from being subjected to the novices' potentially unsafe medical practices.^{39,46,55,69} Besides enhancing the effectiveness of experiential learning, simulation offers an efficient standardised instrument for competency assessment and accreditation.^{58,60} In the United States medical and nursing schools have successfully incorporated simulation into their training programmes. Recently published reports have proved the usefulness of this powerful educational instrument in the training of allergologists in managing emergencies such as anaphylaxis.⁶⁸

In the South African context, the process of incorporating a simulation-based curriculum into allergology training may prove to be complex and expensive. The programme promoters may, however, seek corporate partnerships and share resources with other medical specialties training programmes within universities, public and private hospitals. In the long run, this effort may result in better, safer, patient-centred allergology services.

DECLARATION OF CONFLICT OF INTEREST

The author declares no conflict of interest.

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ALLSA RESEARCH REPORT FEBRUARY 2017

Sharon Kling, Chair, ALLSA Research Subcommittee

The current ALLSA research subcommittee comprises Prof Refiloe Masekela (University of KwaZulu-Natal), Dr Debbie White (University of the Witwatersrand), Prof Sharon Kling (Stellenbosch University, Chair) and Mrs Ruwayda Adams, who provides administrative support and who liaises with the applicants and the sponsors. Mrs Robyn Marais, production editor of *Current Allergy and Clinical Immunology*, liaises with the sponsors for the advertisements to be placed in the journal.

All research applications are submitted electronically. Each application is assessed by two evaluators who are not blinded as to the researcher's identity, as well as by one of the subcommittee members. The scores are averaged and ranked, and final ratification is by the ALLSA Excom.

Between 1991 and 1999 ALLSA research awards have benefitted 30 researchers. From 2000 to date, ALLSA and our sponsors have supported 56 researchers in the fields of allergy and asthma. ALLSA prefers to fund an entire study or a significant part of a research study rather than supplementing the funds of a large study that has major funding; however, ALLSA will make exceptions for meritorious applications.

During the 2015/2016 cycle we received eight applications for research awards and four researchers were successful.

The successful applicants are Drs Jonny Peter (Prospective cohort study of peri-operative anaphylaxis at four hospitals in the greater Cape Town area), Frank Kirstein and Thulja Trikamjee (An analysis of aeroallergens and a comparative study of endotoxin and aeroallergens in dust samples from rural and urban cohorts and comparisons with prevalence of atopic diseases) and Kaarina Meintjes (A pilot study to implement primary healthcare management guidelines for childhood atopic eczema).

The awards were handed out to the successful applicants at the Gala Dinner during the ALLSA Congress at the Century City Convention Centre on 17 September 2016. Congratulations to these researchers; we wish them every success in their research endeavours.

We wish to acknowledge the ongoing support from our sponsors: GSK (the major sponsor over many years), Aspen, MSD and Cipla. Many of the ALLSA-funded research projects have led to local and international publications, and at least six previous recipients of ALLSA research awards have achieved PhD degrees. Among these is Dr Claudia Gray – a recipient of two ALLSA-GSK awards – who achieved her PhD in the field of food allergy and atopic dermatitis. We also wish to thank all our reviewers for their willingness to assist with the reviews, and for their thoughtful and constructive input into our award process.