Institution: Robert Gordon University (RGU)
Unit of Assessment: 3
1. Unit context and structure, research and impact strategy

Since the REF 2014 submission, RGU has undergone a transformational organisational change. At the start of academic session 2016/17 the existing three Faculty-based structure with constituent Schools and Research Institutes, was replaced with a School-based structure comprising eleven academic Schools. The Faculty of Health and Social Care and Institute for Health & Wellbeing Research were dissolved, with research returning into the domain of the individual Schools. A single University-wide Graduate School was formed, generating a stronger and more consistent approach to postgraduate student training and supervision. This strategic realignment has reduced the "silo culture" and enabled greater emphasis on a broader range of research and inter-disciplinary collaborations, within the University and across other organisations.

The REF2014 submission recognised the strategic importance of an alliance between RGU and the University of the Highlands & Islands (UHI); following the outcome of REF2014 the University took a different approach. While there is no longer a formal relationship, several research groups maintain strong collaborative links with UHI in the areas of natural products (metabolomics and lipidomics) and healthcare, with a shared postgraduate research studentship [funded by Digital Health & Care Innovation Centre (DHI)] and co-development of the innovative national health research database [**S**cotland **H**ealth Resea**r**ch **Re**p**o**sitory (SHARP)].

The UoA's impactful research strategy is designed to enhance human health and wellbeing, through excellent social, practical, biomedical, translational, and applied research that informs health, social care and community practices and interventions. By helping to strengthen resilience, practices and capabilities across communities, procedures and systems, this research has addressed issues for specific at-risk groups across the lifespan, discovering and informing new preventative strategies, treatments, and management practices at local, national, and international levels. The approach has been delivered through targeted emphasis on inter-disciplinarity, and applied research capabilities and culture, interwoven with strategic engagement with policy makers, professional bodies, and community stakeholders, resulting in greater sustainable impacts and financial return to the UoA. The strategy encompasses three interdisciplinary themes, beginning at a high level in terms of understanding both community resilience and well-being nationally and internationally within different contexts (**Theme 1: Communities**); recognising the major impacts of long-term health and well-being conditions across different population groups (**Theme 2: Long-term conditions; prevention and management**); and identifying interventions and strategies to improve wellbeing including new pharmaceuticals (**Theme 3: New pharmaceuticals/nutraceuticals & novel target discovery)**. Interdisciplinary research is carried out across the **School of Applied Social Sciences (SASS); School of Health Sciences (SHS); School of Nursing, Midwifery & Paramedic Practice (SNMPP) and School of Pharmacy and Life Sciences (PaLS)**.

Theme 1: Communities: The wellbeing of communities is integral to the university's approach to applied research. Interweaving cultural, economic, environmental, political, and social conditions with fieldwork and practical applications from the health-related and social care professions has enabled the university to deliver research that makes a difference to lives and communities. These local and global dimensions are evident across four strands in our research into the health and well-being of communities: Community empowerment and resilience; prescribing and pharmaceutical care in communities; food insecurity; athletic communities.

Our health and wellbeing research highlights the problems facing communities that hinder their capacity to achieve their potential, and both focuses on empowering solutions and resilience local people have introduced and professional experiences of those who work with communities. Within these dimensions, the importance of time is shown to shape and inhibit behaviours for communities encountering processes of stigmatisation (***Butler-Warke***) and notions of victimhood and reconciliation within post conflict societies such as South Africa and Kenya (***Mueller-Hirth***). These

studies pinpoint the importance of landscape; also, the connection between environment and wellbeing in Vietnam (***Yuill***). In these challenging locations, resilience is paramount for community empowerment and research identifies both local processes of social cohesion in a Kenyan informal settlement (***Vertigans***) and the struggles to bring about transformative change in a South African mining town (***Smith***).

Alongside improving insights both into problems encountered within vulnerable communities and local solutions, our research is directed at other stakeholders involved in empowerment and resilience including learning from professional developments and difficulties experienced by practitioners working in relevant fields. Hence research has been undertaken into Social Work practitioners, health psychology (***Quinn***) and education, concerns about the impacts of neo-liberalism on social workers (***Bolger, Butler-Warke, Yuill***) and service users (***Vertigans***); the requirement to de-colonialise Social Work education (***Smith***); and improve research methods within health psychology and behavioural medicine (***Quinn***).

Internal pump-priming funds have helped to develop this theme, supporting several staff members in this UoA, including collaborative research on regional inequalities, BAME staff and student wellbeing during the COVID-19 pandemic (***Smith***); student mental health during the pandemic (***Butler-Warke, Mueller-Hirth***); campus based security and gender-based violence (***Mueller-Hirth***); informal settlement resilience and food security solutions (***Mueller-Hirth, Vertigans***). These programmes have enabled us to work with stakeholders to apply research that is empowering and transforming the lives of the various communities we engage with.

Our research on key contemporary community healthcare issues includes food insecurity, multi-morbidity, and high-risk prescribing/polypharmacy. The impact of food insecurity and diet on health, long-term conditions and the roles of health care professionals is contributing to the evidence base (***Douglas***). The COVID-19 pandemic has worsened the crisis of food security across all age groups and is a priority area for exploration (***Douglas, Yuill***). Our research is collaborative with the NHS and third sector organisations.

Pharmacy Practice research focuses on innovations in multidisciplinary health, social care education, and practice, with an emphasis on; medicine prescribing; use, effectiveness and safety in individual patients and targeted populations in contexts including health inequalities; remote and rural practice; community pharmacy, and long-term conditions and polypharmacy management. This group works across disciplines to develop sustainable models of integrated multidisciplinary care (independent prescribing, pharmaceutical care, education & inter-professional learning, self-care, technology enhanced practice); and to assess and improve medicines use, effectiveness and safety (specific populations, specific medicine groups and individual medicines, specific processes and procedures [Impact Case Study (ICS); ***Cunningham***]. The work is supported by strong partnerships with stakeholder organisations such as NHS and NHS Education Scotland (NES), and with academic institutions (e.g. University of Strathclyde). Recent collaborations with academic and health care institutions in the Middle East are proving highly effective, with recruitment of fully funded international PhD students from Oman and Qatar, and collaborative competitive applications for local health research funding, for example with Hamad Medical Corporation. High risk prescribing and polypharmacy places significant costs and burdens on health services and has been investigated in primary care across Scotland (***Grant***).

In addition to addressing important health and wellbeing issues, our research within the Communities theme includes impactful work aimed at optimising performance in the athletic community. This includes a series of meta-analyses on beta-alanine supplementation and acute hypoxic exposure (***Swinton***), and studies on ultrasonographic measurement of subcutaneous fat in athletes (***Stewart***). The development of the ultrasonographic method was rapidly accepted for testing elite athletes, and is now being rolled out for non-athletes, the obese and other groups, with a proliferation of training courses worldwide. This is one example of learning from research in this special population being applied across broader populations; something that we will further exploit in future work.

***Future strategy*:**

Post 2020 research into community wellbeing is focussing upon community development and resilience amongst marginalised groups, and the related capabilities and roles of community and professional organisations across local and international boundaries (All 'empowerment and resilience' staff). This group has been strengthened through the recent appointment of a Professor in Social Work as part of RGU's strategic approach to developing senior roles within health and social care collaborations locally and internationally. Research into key community healthcare issues, including food insecurity, is exploring the influence and impact of lived experiences of food insecurity, and economic and social disadvantage on health and wellbeing for people living with health conditions, living in marginalised areas and for families with children (***Douglas, Yuill***). This includes gaining a better understanding of the impact on engagement with health services and health advice, and with help-seeking. Research towards developing and improving impactful models of non-medical prescribing practice, with a focus on pharmacist prescribing in targeted 'at risk' populations internationally, will continue to be a major focus (***Cunningham, Grant***). The UoA has secured Scottish Government funding (£225k) to develop multi-disciplinary research and facilitate knowledge/expertise exchange across HEIs and the NHS through appointment of Scottish Pharmacist Clinical Academic Fellowships. These fellows will develop new collaborations and funding opportunities, and generate an evidence base for pharmacy practice development in areas of national priority. The private and hidden work of polypharmacy for patients and how this evolves with primary care nurses now owning polypharmacy prescribing and medication review, given they are trained to take a more relational than biomedical approach to care, is also a key area for future investigation (***Grant, Kennedy, Torrance***). Within the area of athletic performance, future work will combine expertise in the areas of primary data collection, mathematical modelling of training (***Swinton***), and evidence synthesis (***Alexander, Cooper, Swinton***) to create innovative research processes that can be applied across a range of topics for both the athletic and broader communities, for example developing predictive models for performance and injury outcomes.

Theme 2: Long-term conditions; prevention and management. Applied, practical multidisciplinary research in this UoA addresses major societal challenges including the ageing population and long-term condition prevalence, and subsequent personal, social, and financial burden on individuals, families, and communities. Research focusses on prevention and optimal management of long-term conditions, spanning birth to end of life, and is driven by the needs of the individual, specific population groups, health and social care services, and communities. Key research areas include musculoskeletal health; chronic pain management and quality of life; ageing and end of life care; diet, prevention, and management of long-term conditions; workplace health, wellbeing and ergonomics**;** and remote and rural health.

The musculoskeletal health group enjoys close collaboration with NHS Grampian and regular patient and public involvement (PPI) to inform research direction. Income from EU (Horizon 2020), NIHR, UK charities and NHS has supported this work. Achievements include developing and testing a peer-support intervention for older people with chronic low back pain and synthesising the evidence on weight loss for adults, pain neuroscience education, and exercise for tendinopathy (***Alexander,* Cooper, Swinton**). Interdisciplinary work with the School of Computing on digital health interventions for low back pain, mental wellbeing, and active ageing, have produced successful collaborations, notably the EU-funded selfBACK (***Cooper***). Continued investment in our state-of-the-art human performance and ergonomics laboratories has facilitated growth in research on the role of movement analysis in long-term conditions, including diabetes [in collaboration with Manipal Academy of Higher Education (Agouris)].

Our workplace health, wellbeing and ergonomics work includes award-winning research on the impact of rising levels of obesity in the offshore oil and gas industry (ICS; ***Stewart***) and the Blade Access System and Working Environment study (***Cooper, Stewart***), funded by Innovation UK and involving an industry-led consortium (SPAN Access Solutions Ltd) to create a cradle suspension system for wind turbine repair, where we explored ergonomic factors and made practice recommendations. Research on return to work includes functional capacity evaluation and successive commissioned service evaluations for vocational rehabilitation providers

(***Alexander***), who have implemented our findings to enhance services. The musculoskeletal group also hosts a CSO NRS post-doctoral clinical fellow supervised by ***Cooper*** in collaboration with NHS Grampian's Consultant Allied Health Professional (AHP) in stroke.

Our work across the life span includes the attitudes of nurses and student nurses to working with older people, including international collaborative survey research. The emphasis on older people is supported by a Horizon 2020 award focussing on perspectives of ageism across Europe (***Kydd***). The Euro-ageism study, led by Bar-Ilan University in Israel, is a European collaboration of 6 academic Institutions, NGOs, and the WHO.

Establishing the clinical and cost-effectiveness of biofeedback-mediated intensive pelvic floor muscle training compared with basic pelvic floor muscle training for treating female stress urinary incontinence or mixed urinary incontinence informed national guidelines. This interdisciplinary RCT (HTA) was a collaboration across Scotland, England, and New Zealand (***Grant***).

Multidisciplinary research on chronic pain, neuropathic pain and health related quality of life has been published widely (over 4,300 citations), studying its epidemiology, primary care management and self-management. Research on the epidemiology and use of screening tools for neuropathic pain have been cited in national (NICE) and international (NeuPSIG) guidelines Further research on the rise of opioid prescribing in Scotland prompted updated recommendations to national guidelines (SIGN) (***Torrance***).

Other contributions to the evidence base for long-term conditions include evidence syntheses conducted by multi-disciplinary teams to inform decision making at the end of life: diagnosing dying with Marie Curie Cancer Care, Edinburgh Napier University, Karlstad University and University College Dublin (***Kennedy***); interventions to prevent falls for people with Multiple Sclerosis in collaboration with the University of Limerick and Queen's University Canada and funded by the Health Research Board Ireland (Cochrane review; ***Kennedy***) and swallowing exercises for patients with head and neck cancers in collaboration with the Universities of Limerick and Melbourne (Cochrane review: ***Kennedy & Lee***). A systematic review of team working in primary care using Normalisation Process Theory (***Lee & Kennedy***) provided evidence to inform health and social care services in the community. ***Lee*** conducted a systematic review and meta-analysis to assess the effectiveness of mHealth interventions for maternal, newborn and child health (MNCH) in low and middle-income countries.

Remote and rural health is relevant to our geographical location and during this REF period we have secured external funding for two DHI Scholarships linked to digital health and midwifery (***Grant & Kennedy***); NHS Endowment funds to explore Midwives', health visitors', family nurse practitioners' and women's experiences of NHS Grampian's Financial Inclusion Pathway in rural areas (***Douglas***); family carers' experiences of rapid transition from hospital to home at the end of life ***(Kennedy & Lee***); Health Foundation support to evaluate the NHS Highlands telehealth pilot of pharmaceutical care provision to dispensing medical practices (***Cunningham***); and pump priming monies exploring polypharmacy treatment burden and shared decision-making in Orkney (***Grant***). Research on mental wellbeing in the Scottish farming population (***Cooper***), funded by CSO and pump-priming monies has resulted in active collaboration between RGU, NHS Grampian, NFU Scotland, and members of the farming community, with work ongoing to develop and test interventions to support farmers' well-being.

Nutritional research carried out within the UoA (***Bermano, Duthie, Masson***) addresses the positive and negative impact of diet on several major long-term conditions including cancer, vascular disease, dementia, obesity, non-alcoholic fatty liver disease (NAFLD), and diabetes. This comprehensive research looks at the influence of diet at the level of the individual gene or protein, through animal studies and specific at-risk groups (human observational and intervention studies), to analysis of national dietary surveys (***Masson***; Living Costs & Food Survey and Scottish Health Survey). This research has contributed to the knowledge base and has informed public health policy (ICS; ***Masson***). A major strategy is to identify how whole-food diets and individual dietary nutrients can be

used to prevent major long-term conditions and develop appropriate and sustainable interventions that facilitate behaviour change and improve human health (***Bermano, Duthie, Masson***).

A sustained focus has been on how key dietary components act mechanistically to alter disease risk. Cutting-edge-OMIC and epigenetics technologies, together with validated molecular biology analyses, have established how nutrient-gene interactions influence human prostate cancer severity and prognosis (***Bermano***); the role of leptin as an inducer of breast cancer cell proliferation within the obesity-breast cancer connection (***Bermano***); and the impact of folate or zinc deficiency in aorta plaque formation and vascular disease (***Duthie***). The positive impact of folate and vitamin B12 status on hyper-homocysteinemia and dementia incidence has also been studied (***Duthie***). The UoA has identified how whole foods, nutrients and phytochemicals (***Masson***) and interventions (fruit and vegetables; exercise), positively affect biomarkers of NAFLD in vivo (***Bermano***), and in human vascular disease and cancer (***Duthie***) and how fasting and postprandial changes in various stress and genetic markers of human health respond to diet and are subject to inter-individual variation (***Duthie***). New nutraceuticals, derived from industrial rapeseed oil processing (***Barron, Bermano, Goua, Kong***) are undergoing revalorisation as a source of antioxidants for the Food & Drink Industry.

The UoA is highly active in monitoring progress towards Scottish Government's dietary goals, and contributing to the development and evaluation of public health nutrition policy to reduce obesity. This involves monitoring changes in dietary intake over time and inequalities in dietary intake across levels of deprivation (***Masson, Douglas***). Other work involves assessing dietary and physical activity behaviour changes in individuals undergoing cancer screening and in cancer survivors (***Masson***).

Future strategy:

Future research in the area of musculoskeletal health includes updating exercise prescription methodology for various musculoskeletal conditions and developing and testing increasingly personalised digital health interventions for supported self-management of long-term conditions, including people with multimorbidity. Continuing research will involve developing methods to capture, compare and contrast outcomes and experiences of important health problems for remote and rural communities, as well as developing and evaluating interventions and activities aimed at enhancing health and wellbeing in this population. Linking this work to our key theme of long-term conditions will build on existing research and contribute to the understanding of peoples' experiences and service delivery across a range of long-term conditions (***Alexander, Cooper, Douglas, Grant, Kennedy, Kydd, Lee, Torrance***). Within the area of diet, we will establish further how diet influences obesity, metabolic syndrome, vascular disease, and cancer. We will advance biomarker discovery and apply nutrigenomic technologies to better understand how whole foods, micronutrients/dietary components and natural products act in prevention and management. Research groups within the UK are being brought together (***Bermano***) to investigate the benefits of selenium on human health (submitted BBSRC/UKRI). The research will establish the benefits of fortification of soil with selenium and the products created from selenium-fortified legumes, oats, and wheat on a local population. Moreover, the UoA will employ their expertise to establish whether selenium status influences COVID-19 outcome. Mandatory folic acid fortification at a population level has raised concerns of a detrimental effect on at-risk groups, including the elderly and people with cancer. The impact of different folate vitamers (used in fortification) at nutritional and supraphysiological levels will be investigated on biomarkers of inflammation and malignant transformation in human colonocytes (***Bermano, Duthie, Goua***). The emerging beneficial effects of novel nutraceuticals from rapeseed extract against inflammation and genomic stability will be established in breast and colon cancer cells in vitro (***Barron, Bermano, Goua***). The UoA will continue to provide translational evidence-based dietary guidance to inform stakeholders and decision-makers and impact public health nutrition policy. This will include acting to improve the Scottish diet by; monitoring the dietary intake of the Scottish population; the relationship between food insecurity and health the nutritional composition and cost of foods available in supermarkets and the possible contribution to inequalities in nutritional status and health; and the content and quality of dietary messages in the media (***Douglas, Masson***); A new initiative is to evaluate the effectiveness of educational resources on nutrition for cancer survivors, their carers, and health professionals who work in cancer prevention

and survival. This research will be carried out in collaboration with Cancer Link Aberdeen & North which supports anyone affected by cancer (***Masson***).

Theme 3: New pharmaceuticals/nutraceuticals & novel target discovery. This area of research links with work on the prevention and management of long-term conditions and the safe use of medicines. Key research areas include natural products as novel nutra- and pharmaceuticals; identification of new molecular targets for natural product and synthetic drug discovery in the treatment of chronic disease and antibiotic resistance; and discovery of novel high value therapeutics from bioprocessing waste.

Now embedded within the theme of "New pharmaceuticals/nutraceuticals and novel target discovery", natural products research has gone from strength to strength. The focus on drug and nutraceutical discovery from terrestrial and marine organisms has expanded to investigate the novel therapeutic properties and industrial worth of agricultural by-products (valorisation of bioprocessing waste). The group (***Barron, Bermano, Goua, Kay, Kong, Lamb, Wainwright, Walsh***) has made a significant contribution to the research knowledge base and to the strategic development of natural product research at local, national, and international level. The pan-Scotland proposal to create a pipeline for natural products referred to in REF2014 has been adopted by ScotChem and SULSA, with the support of IBioIC, the Scottish Aquaculture Innovation Centre and the KTN Bioeconomy Cluster Builder, culminating in the recently launched Scottish Natural products Network.

The group has identified novel molecular targets for both natural product and synthetic drug discovery. In vitro models are employed to study the mechanisms of angiogenesis in breast cancer metastasis, with a view to identifying targets (e.g. chemoresistance efflux transporter) for new cancer therapies (***Barron***). Studies with mice lacking the GPR55 have identified a role for this orphan receptor in the pathogenesis of metabolic syndrome and in cardiac dysfunction, while the frizzled/Wnt signaling pathway has been identified as a target for the prevention of heart failure (***Wainwright, Walsh***). Moreover, a combined in vitro (adipocytes) and in vivo (C Elegans) approach has identified novel targets for the prevention of obesity (***Bermano, Wainwright***). Notable findings include; discovery of modified DNA damaging drugs, vanillin derivatives, and novel pharmaceuticals isolated from rapeseed pomace as new drug candidates against Alzheimer's and Parkinson's Disease (***Barron, Bermano, Goua, Kay, Kong***); the ability of extracts from native Scottish plants to target the chemoresistance efflux transporter in leukaemia and breast cancer cells (***Barron, Bermano, Wainwright***); chemotherapy-induced toxicity in cardiomyocytes is reduced by the phytocannabinoid cannabidiol (***Barron, Walsh***); and extracts of marine algae modify adipocyte differentiation (***Bermano, Wainwright***). Many of these fundamental research programmes are in collaboration with industry, but the capacity to undertake contract research has also been made possible by institutional strategic investment in high throughput screening equipment and the acquisition of the Strathclyde Natural products collection of >6,000 plant extracts sold on a commercial basis.

Future strategy:

The development of new high value nutraceuticals from industrial waste processing for use in the Food & Drink industry will continue (***Bermano, Goua, Kong, Wainwright***). Additionally, a framework, tailored to SME Food & Drink producers in rural Scotland will address issues associated with reducing food waste and transitioning to a circular economy paradigm. Establishing the use of natural products as novel pharmaceuticals will remain a major research theme. New funding (Proof-of-Concept grant and an IBioIC PhD studentship) will explore the use of daffodil-derived alkaloids to prevent events leading to heart failure and to identify non-alkaloid compounds as nutraceuticals (***Bermano, Wainwright, Walsh***). Further funding will allow for the generation of candidate compounds for clinical testing and will involve wider collaborations with, for example, colleagues at Kew Gardens. An emergent area of activity is the identification of molecular targets and the development of innovative new therapeutics to treat cancer. Research establishing how plant extracts overcome chemoresistance in breast cancer will be a major new focus of the UoA (***Barron, Bermano***). Preliminary findings have identified several exciting candidates, and a new collaboration with the James Hutton Institute, together with "seed-funding" from SCOTCHEM/SULSA, will drive

this research forward. In addition to identifying new drug treatment/adjuvant therapies, this work will identify alternative crop sources and contribute towards the Government's pledge to make Scotland a zero-waste society by 2025. The innovative work developing new treatments for neurodegenerative diseases will continue, with the aim to design a life-changing drug against Alzheimer disease (***Kay, Kong***). Working with established partners in Portugal, the proof of concept for a multitarget drug based on natural products will be realised, paving the way to seek further clinical collaborations and funding. The identification of therapeutic targets for CVD will continue to grow (***Wainwright, Walsh***) in collaboration with established (University of Aberdeen) and new partnerships (University of Dundee, Heriot Watt). The initial focus will be on diastolic heart failure and chemotherapy-induced cardiotoxicity and hypertension, and funding is being sought from British Heart Foundation (BHF) and Heart Research UK. Moreover, the UoA will build upon research in the field of cannabinoids in CVD. Working in partnership with a Medical Cannabis company (Leafcann), the group will investigate the therapeutic value of non-psychoactive compounds from Cannabis sativa in CVD and identify settings in which cannabis-derived compounds may have detrimental effects both in health and disease (***Wainwright***). A highly novel area is the use of data mining to identify molecular leads from Hafnia alvei soil isolate to be exploited as new therapeutic antibacterial agents in the global fight against antimicrobial resistance (***Lamb***). Secondary metabolite biosynthetic gene clusters with known antibiotic activities have been identified. Future work will screen for antibacterial activity, together with metabolite production and structural elucidation. New partnerships with University College London and Queens University Belfast will seek funding from MRC and BBSRC under the UKRI Combating Microbial Resistance Initiative, to accelerate this work.

Cutting across all three themes is the expertise and reputation for excellence in evidence synthesis. The SHS hosts the Scottish Centre for Evidence-based, Multi-professional Practice: A JBI Centre of Excellence (led by ***Cooper***), consistently attracting UK and international candidates to training courses, contributing to updated methodological guidance (***Alexander, Cooper***), and attracting consistent grant income over this REF period (CSO, NIHR, NHS, industry). Systematic review courses are also provided for RGU staff and postgraduate research (PGR) students, and for staff and students at Karlstad University in Sweden (***Kennedy, Lee***). The centre includes statistical expertise in advanced meta-analysis techniques (***Swinton***). Future strategy in this area will include building on the team's expertise in conducting large meta-analyses, combining expertise in mixed methods synthesis and advanced statistical techniques to address research questions most relevant to practitioners. A strong record of accomplishment in delivering large evidence synthesis grants will be used to regularly target NIHR commissioned and researcher-led funding to contribute impactful findings in our fields of expertise.

Emerging research opportunities and future collaborations:

Research opportunities from the COVID-19 pandemic have facilitated the creation of multidisciplinary research groups within the UoA, providing a platform for future collaborations. To date, we have secured funding from CSOs first COVID-19 call to investigate health and social care students' and recent graduates' clinical placement and professional practice experiences and coping strategies during the Wave 1 COVID-19 pandemic period (***Butler-Warke, Cunningham, Douglas, Grant, Kennedy, Kydd, Torrance***). All four Schools in the UoA were involved in this work, as principal/co-investigators or advisors (***Cooper, Lee***), exemplifying increasing cross-disciplinary collaboration. Two further CSO grants have been awarded recently. One for investigating the impact of long-covid on health workers across Scotland (***Douglas, Grant, Kennedy, Kydd, Torrance***) in collaboration with St Andrews and Aberdeen Universities, and one for evaluating emerging models of long-covid rehabilitation in Scotland (***Alexander, Cooper, Swinton***) in collaboration with Universities of Stirling, Dundee, and NHS Ayrshire & Arran. Internal pump-priming funds have also been awarded to explore the lived experiences of nurses in the acute sector of working during the pandemic (***Douglas, Grant, Kennedy, Torrance***), which will build on our earlier work on students' experiences, and to explore the impact of remotely delivered rehabilitation on exercise prescription (***Cooper, Swinton***) and AHP services (***Alexander, Cooper***). We anticipate that COVID-19-related research and the questions it generates will be an important part of our future strategy across all three themes. Moreover, the multidisciplinary collaborations that have emerged in response to

COVID-19 provide a platform for addressing other key research priorities such as healthy ageing, multimorbidity, polypharmacy, food insecurity, and health inequalities.

2. People

Staffing strategy and staff development:

Due to the strategic internal restructuring, the programme of voluntary severance (VS) described previously (REF5a), and movement of colleagues to other institutions and Scottish Government positions, the staff landscape has seen investment and expansion in two of the UoAs four Schools (SHS, SNMPP), a decline in staffing in one (PaLS) and a similar staffing level maintained in the other (SASS). Overall, the UoA has lost 12 research staff over the period. Strategic appointments within the REF period cross all three thematic research areas have been designed to grow critical mass, contribute to research leadership, and address succession planning. These appointments include: QNIS Professor of Community Nursing (***Kennedy***); two Clinical Professors (***Cooper***, AHP; ***Kydd***, Nursing) jointly funded by RGU and NHS Grampian to contribute to research leadership across both institutions; Reader (***Douglas***); two Senior Research Fellows (***Grant, Torrance***); two Research Fellows, and a Research Assistant/Fellow (***Butler-Warke***) who was subsequently appointed as lecturer. Internal promotions allowed for the replacement of a Professor of Pharmacy Practice & Education (***Cunningham***) and Professor of Molecular Nutrition (***Duthie***). In addition, appointment of 8.4 FTE research assistants/fellows were made with a combination of internal and external grant funding to support the group's growing research portfolio. A Professor of Social Work and an AHP Research Fellow have recently been appointed.

As part of our strategy to undertake multidisciplinary, collaborative, and impactful research, the group maintains strong links with Scottish Government and the NHS, both locally and nationally, and is committed to developing clinical academic research careers (CARCs) across the professions. This is evidenced by the two joint Professorial appointments previously mentioned, and the group currently hosting one CSO clinical academic doctoral and one post-doctoral fellow, with three clinical fellows in Pharmacy Practice research to be appointed between PaLS and NES in 2021. The newly appointed AHP fellow will develop a programme of collaborative research with the NHS. The two Clinical Professors co-chair NoSCAR (see Section 4), a collaboration between RGU and NHS Grampian to increase research capacity and capability in the Nursing, Midwifery and AHP (NMAHP) workforce. CARCs are high on this group's agenda, with local work being conducted to progress CARCs, as well as linking with national (Scottish and UK) working groups.

In 2017, the University introduced a new career progression framework to provide greater opportunities, clarity and consistency across roles and disciplines. A process for progression from Research Fellow to Senior Research Fellow was initiated and a new role of Senior Lecturer A (SLA) was created for staff who evidence excellence in research and/or teaching. For research active staff, the SLA role provides the development bridge from lecturer and Research Fellow to Reader and Professor. To date four SLA appointments have been made within the UoA, spanning research across all three themes.

Going forward, our goal is to expand our research teams by recruiting research-active doctoral staff and by "growing our own" highly talented researchers. New appointments are made using robust Institutional policies, with scrupulous attention given to maximising equality of opportunity. Since 2014, we have made considerable progress building the research culture across this UoA, which has high undergraduate student numbers. All new and existing staff are developed to reach their full potential through a comprehensive programme of University and UoA-specific initiatives. These include cohort-based Institutional Leadership programmes, mentorship by research-active colleagues, Leads and Professoriate; funded sabbaticals; personal coaching; peer-training within the environment of the School Research Committees (SRCs); training at seminar series' (internal and external experts and stakeholders, including NHS); undergraduate summer studentships to support proof-of-concept research projects; and internally-funded PGR degree progression. Staff who join without recognised research experience are encouraged to study for PGR degrees, while

existing staff who wish to attain a PGR degree are supported by the UoA's core research team. Staff development is linked to the annual employee performance review (EPR) and is supported from a total personal and professional development budget across the four Schools of over £40K annually. The UoA has supported 14 PhD, 1 MRes and 3 professional doctorate staff completions over the reporting period and is currently supporting 15 PhD and 8 MRes staff.

Initiatives to support the training of future research leaders are through the Early Career Researchers Network hosted by the Graduate School, with the UoA fully committed to the Concordat to Support the Career Development of Researchers. Academic staff workload is monitored through the Schools' staff matrix, and ECRs are given a lighter workload at the outset to allow them to focus on developing their research. Additionally, ECRs take an active role within the individual SRCs and are provided a research mentor from within the experienced staff body. Pump Priming Projects and conference attendance requests submitted by ECRs are funded preferentially by the SRC. Periodically, the UoA (via SRC) provides support to ECRs by funding full cost or fee-only studentships to "kick start" their research. All ECRs are encouraged to join relevant professional societies. In addition, Readers are allocated 80% of their time to research to help facilitate timely promotion to Professor. The success of our comprehensive staff development strategy is evidenced by 20 of the 29 2021 UoA staff being submitted to REF for the first time.

Staff are required to reflect on the impact of their research. During the EPR process, KPIs (publications, research income, knowledge exchange) and demonstration of research impact are discussed with the Research Lead. Additionally, all draft publications and grant applications undergo rigorous internal peer-review, for both quality and impact strategy. Training in how to achieve impact is provided through in-house workshops hosted by external experts in this area. Success in obtaining research income is rewarded by the part return of research overheads to the PI for reinvestment.

The staff characteristics of the submission reflects broadly the academic population across all four Schools (63-75% female) within the UoA. Nineteen women and 10 men (female:male ratio approx. 2:1) are included in the submission, with the majority working full time, and with a range of flexible working patterns.

Postgraduate Research Students and Supervision:
We have a vibrant community of PGR students with opportunities to study for PhD; MRes; Doctorate of Physiotherapy (DPT) and Doctorate of Psychoanalytic Psychotherapy (DPsych) in topics related to the main research themes. Currently the UoA has 14 MRes, 55 PhD, 8 DPT, and 2 DPsych students, with 42 PhD completions across the reporting period.

Funding for PGR studentships comes from a variety of sources including industry (Scottish Water); charities (e.g. Carnegie, BHF, Tenovus UK, Parkinson's UK); Scottish Government (CSO; Hydro Nation); Overseas Governments (Germany, Ghana, Oman, Saudi); UK Research Councils (MRC, BBSRC); Europe (Horizon 2020); and in partnership with stakeholders (Marine Scotland, NHS Grampian, NES) or other collaborators (Hamad Medical Corporation, DHI). Sixteen PhD studentships have been funded through Internal competitive funding. An increasing number of studentships are self-funded, and for those who are academic or NHS staff, most study part time.

The UoA provides a supportive research environment from induction to completion of PGR degrees and ensures that PGRs are fully engaged, trained, and prepared for a future in research. PGR supervisory teams are chosen based upon the "best fit" for knowledge and experience, generally consist of two research-active staff members, and are multidisciplinary across the UoA or broader Institution. Teams may include three supervisors led by an experienced supervisor in order to develop expertise and achieve timely completions. Each School within the UoA has a Research Degrees Coordinator who communicates with the Graduate School and Admissions, ensures supervisory arrangements are appropriate, oversees research student reporting, and is a source of information and support for students and supervisors. All UoA training is mapped to the Vitae framework to ensure that students receive a rounded education and rewarding experience. UoA training includes research seminars (internal and external expert speakers); journal clubs; and School Staff/Student symposia (annually). These regular events embed the students firmly within

the research culture and allow them to improve their presentation and oral defence skills, and engage with their peers and external experts. All PGRs are funded to present at one national and one international conference within their studentship. Students are encouraged to participate in public outreach activities including RGU Open Days; NHS Celebrating Excellence events; TechFest; events with local schools, and with the Aberdeen Science Centre (ASC; STEM hub for the North-East of Scotland). Through this community collaboration, PGR students can become STEM ambassadors and run STEM workshops for school children and the wider public. These events develop PGR student communication skills, improve their confidence at public speaking and engage the wider public with the University's research.

The quality of research training, and provision of a vibrant research culture to the student community is borne out by our increasing student admissions; our improved completion rates; how we are viewed by our students; and our exceptional employment statistics.

3. Income, infrastructure and facilities

Income: Over the reporting period the UoA has secured over £3.8m in research income from diverse sources including UKRI Research Councils; charities; NIHR; the European Union; the Scottish Government and associated departments. Of note is income generated to develop novel therapeutics/nutraceuticals from natural products and commercial waste streams (£1m); a Horizon 2020 project of Euro Ageism (£420K); an NIHR commissioned evidence synthesis on exercise for tendinopathy (£228K) and two recent projects funded by CSO investigating the impact of long-COVID-19 on health and social care staff and service delivery models for long-covid rehabilitation (£594K). We have already secured in excess of £0.5m for research beyond 2020, demonstrating the success and sustainability of our strategy.

Research infrastructure and major capital equipment investment: Since 2014, the University has invested substantially in major building infrastructure, dedicated research facilities and workspaces to support clinical and applied research within the UoA. Custom built facilities provide state-of-the-art research amenities, including a Biological Services Unit (which houses rats, mice and GM breeding colonies and supports short and long-term studies, surgeries and metabolic studies) and outstanding suites of laboratories for undertaking in vivo and in vitro research including cell culture (cell counting and real time imaging); molecular biology (real time qPCR and Agilent 2100 Bioanalyzer system for RNA/DNA quality control and gene expression analyses; Luminex 100 for multiplex analysis of proteins; and Conelab 30 for biomarker analyses in clinical samples); histology and fluorescent imaging technologies (light and fluorescence microscopes and imaging software, FLOW cytometry); and drug formulation and delivery (NMR, LC-MSMS, and tableting). New clinical facilities for human studies have been created for accurate measurement (3D scanning; handheld Artec 3D scanners; body composition measurement air displacement plethysmography [BodPod]; resting metabolic rate [Indirect Calorimetry Metabolimeter, Cosmed Quark RMR]). The Human Performance Laboratory has seen significant investment (>£200K) to upgrade key equipment including two 3D optical motion capture systems, isokinetic dynamometry, and physiological testing equipment, ensuring the availability of state-of-the-art facilities research on human movement and athletic performance research. These new facilities host a purpose-built Research Student Hub for students to work and socialise.

Institutional funds have also secured key pieces of equipment to support multidisciplinary research including a platform of HPLCs (£75K); a water purification system (£148K); GCMS (£66K); FLOW Cytometer (£39K); rheometer (£75K); and a Victor Nivo Multiplate Reader to support the natural product screening programmes (£28K). The UoA has also benefitted substantially from equipment grants [e.g. FLOW Cytometer (£24K); Odyssey Dual Imager (£45K)] and donations [e.g. Strathclyde Natural Products Library, Strathclyde University] for the in-house screening and commercial sale of extracts. Furthermore, access to and sharing of research facilities and services with other local institutions (e.g. MRF, University of Aberdeen; Metabolomics, James Hutton Institute) and collaborations maintained with UHI (Lipidomics Facility) strengthens our capacity to deliver maximum research impact. Research directly within the UoA is supported by dedicated

administrative and technical staff, including a trained named Animal Care & Welfare Officer (NACWO) within the BSU and an Applications Supervisor in the Human Performance Laboratory.

4. Collaboration and contribution to the research base, economy and society

Regional and National Collaborations: We have extensive collaborations with the NHS, for example our two joint-funded professorial appointments with NHS Grampian, who co-lead the North East Scotland Centre for Applied NMAHP Research. UoA staff are represented on NHS Grampian's Inequalities steering group (***Douglas***); Public health planning for COVID-19 recovery working group (***Douglas***); Research recovery (COVID-19) working group (***Cooper, Kydd***); Long-term condition management transformation board (***Douglas, Grant***); Magnet advisory group (***Kennedy***), and AHP advisory committee (***Cooper***). UoA staff are fully cognisant of local priorities, and collaborative studies have been conducted over this REF period due to these links. Collaborations with NHS more widely, via the Council for AHP Research (North of Scotland hub led by ***Alexander***) has facilitated multi-site knowledge exchange activities. Food insecurity collaborations include Food Standards Scotland, and Joseph Rowntree Foundation (***Douglas***).

Inter-professional working and education has been the focal point for various collaborative projects. For instance, research was one of a suite of commissions by the Scottish Social Services Council to provide an evidence base for the Review of Social Work Education (started 2017). The nine providers of social work education in Scotland were involved in the project. Since 2019, a project has been developing an online research resource for those working in health and social care with The Care Inspectorate and IRISS. Services to children and young people have also been the subject for collaborative projects including a recent research project with Aberdeen City Council exploring experiences of Looked After and Accommodated Children and Young People placed out with the Region (***Bolger***).

Several productive collaborations are a result of the JBI Centre of Excellence, notably with Teesside University (co-publication) and the Scottish Intercollegiate Guidelines Network (advising on qualitative methodology, guideline development work, co-publication). Collaborations with English Heritage and Historic Environment Scotland resulted in funded ergonomics research to inform visitor flow in historic buildings. We also have extensive academic collaborations throughout the UK, for example an ongoing NIHR-funded evidence synthesis (Queen Mary University, London, also SportScotland and NHS); CSO-Scotland-funded long-covid studies (Stirling, Dundee, Aberdeen, St Andrews); as well as joint PhD supervisions (e.g. Glasgow Caledonian, Edinburgh Napier, University of Limerick).

International Collaborations: Effective international collaborations include: EU-funded projects SIMPATHY (***Cunningham,*** Stewart); selfBACK (***Cooper***); EuroAgeism (***Kydd***); Folate & Health Global Policy Evaluation (***Duthie***); Spanish Ministry of Science funded study on nutraceuticals for treating obesity (***Bermano, Goua***); and research on natural products for preventing and managing neurodegenerative diseases (Scotland-Portugal collaboration; ***Kay, Kong***). Several highly successful athletic performance collaborations have developed over the assessment period, most notably with University of São Paulo (***Swinton***) described by *Science in Sport and Exercise* Editor as prolific and world leading. UoA staff have also collaborated on anthropometry surveys in the New Zealand Defence Force (***Stewart***). Moreover, research programmes supported by GCRF/SFC have built capacity within educational institutions and community-based organisations in Kenya and Vietnam and empowered of participants living in informal settlements who have contributed to the design, delivery and dissemination of fieldwork in areas such as resilience, food security and peace building (***Mueller-Hirth, Vertigans, Yuill***).

Industrial collaborations and Knowledge Transfer Partnerships: Our highly successful industrial collaborations include: Astra Zeneca (with University of Dundee), attracting UKRI funding to determine the role of the GPR55 receptor in atherosclerosis and heart failure; Algaia (France) and MacIntosh (Glendaveny), securing IBioIC/BBSRC funding to discover novel anti-obesity nutraceutical waste products from the seaweed industry and as feed from rape pomace in the commercial production of insects (as an alternative source of protein) in the Food & Drink Industry;

Sutherland (Portsoy), for research on the deployment of fish waste nutraceuticals in the manufacture of high value fish oils, minerals and nutrients; SPAN Access Solutions Ltd, attracting Innovate UK funding to develop a novel system for technicians to access offshore wind turbine blades for maintenance purposes.

Knowledge Transfer Partnerships (KTPs) have provided an important framework for the UoA to help inform local businesses, often with international impact, for example informing safety and workforce productivity in the offshore oil & gas industry (ICS; ***Stewart***), and under the umbrella of Innovate UK an in-depth qualitative understanding of a multinational workforce has informed safety performance and increase workforce productivity.

Contribution to the research base: Colleagues in the UoA play a major role in shaping the national and international research landscape and public policy through participation in knowledge exchange; by supporting the activities of learned bodies and societies; as members of Government advisory bodies and research advisory panels; and by contributing to academic journals. Selected examples across the UoA include:
Editorial boards: British Journal of Community Nursing (***Kennedy***); Critical and Radical Social Work Journal (Chairperson and Africa regional editor), International Social Work (***Smith***); Human Figurations, International Journal of Corporate Social Responsibility (***Vertigans***); JBI Evidence Synthesis (***Cooper***); Maturitas (***Kydd***); Social Work and Social Sciences Review (***Yuill***); Time and Society (***Mueller-Hirth***)
Society Fellows: Association for Applied Biology Food Systems Working Group (***Duthie***); ScotChem/SULSA Scottish Natural Product Network (Steering Group), International Union of Basic and Clinical Pharmacology Natural Products Section, British Pharmacological Society (BPS; Vice President), BPS Natural Products Network lead (***Wainwright***); British Sociological Association Treasurer and Vice-chair elect (***Yuill***); Chartered Institute of Ergonomics and Human Factors (***Stewart***); Chartered Society of Chemists (***Kong***); Royal Society of Chemistry (***Kay, Kong***); Royal Pharmaceutical Society (***Cunningham***); International Sociological Association, Research Committee Comparative Sociology (Treasurer; ***Vertigans***); Sigma Nursing International Society (Upsilon Xi Chapter Secretary elect; ***Kydd***); Nutrition Society (and Scottish Section; ***Masson***).
External Committees: Aberdeen Sustainable Food City (***Douglas***); Excellence in Care Steering Group (***Kydd***); Health and Safety Executive (HSE; musculoskeletal disorder risk reduction, International Olympic Committee (IOC, Medical Commission Working Group on Body Composition), International Society for the Advancement of Kinanthropometry (***Stewart***); National UK Steering Committee of the Social Work Action Network, Research Ethics Committee for Scottish Children's Reporter Administration, Social Work Action Network International (***Smith***); NHS North of Scotland Research Ethics Committee (***Butler-Warke***)
Expert panels, advisory boards, and grant awarding committees: Charted Society of Physiotherapy Research Foundation (vice-chair, ***Cooper***); Food Standards Agency UK Advisory Committee Novel Foods and Processes (***Duthie***); Food Standards Scotland (***Douglas, Masson***); Generation Scotland Expert Working Group for Pain (**Torrance**); Joseph Rowntree Foundation (***Douglas***); British Council, Newton Fund, SULSA (***Barron, Bermano***); Opportunity North East Life Sciences Board (***Bermano, Wainwright***); Commonwealth Scholarship Academic Advisory Panel (***Kong***); Scientific Advisory Board IBioIC (***Wainwright***).
Conference organisation and chairing*:* Chair: 55th International Conference on the Bioscience of Lipid (ICBL; 2014, ***Wainwright***); Organisers: IUPHAR World Congress of Natural Product Pharmacology (2017, ***Bermano, Wainwright***); UKEMS Molecular Epidemiology Group annual conference (2017, ***Duthie***); "Infectious Diseases: the battle we will win", 6th International Pharmaceutical Federation (FIP) Sciences World Congress (2017, ***Lamb***); International Collaboration for Community Health Nursing Research Conference (2022, ***Kennedy***).
Honorary appointments: University of Aberdeen (Honorary Professor, ***Duthie***); Queen's Nursing Institute Scotland (Professor of Community Nursing), University of Limerick (Adjunct Professor), Karlstad University Sweden (Visiting Professor) (***Kennedy***); Zurich University of Applied Studies (Visiting Professor, ***Kydd***); Universities of Edinburgh (***Lee***), Bournemouth (***Douglas***), Stirling (***Grant***) visiting researchers.

Sustainability of the discipline and response to national and international research priorities: Our research and human resource strategy (see above) enables capacity to prioritise pressing issues that require timely and sustainable solutions. This is exemplified by the UoA's swift responses to the COVID-19 pandemic, and to national and international calls for research in several priority areas. Information on the role of selenium in COVID-19 virulence has already been disseminated (***Bermano***), and we contributed to National guidelines on the long-term effects of COVID-19 (***Cooper***). Internationally, research has been conducted with a Kenyan community group in an informal settlement throughout the period of the pandemic, gaining insights into local resources that enable challenges to be addressed and impacts on levels of resilience and food security (***Mueller-Hirth, Vertigans***).

UoA research is directed to the UN's Sustainable Development Goals (SDGs) to deliver project aims and themes against sustainable outcomes. Of particular relevance to this submission are Eradicate poverty (SDG1); Zero hunger (SDG2); Good health and wellbeing (SDG3); Reduced inequalities (SDG10); and Peace, justice, and strong institutions (SDG16). Other pertinent examples include (in SDG2), antibiotic resistance. A "discovery" project (Tenovus UK) aims to identify new molecular leads and therapeutic antibacterial agents in the global fight against the spread of antimicrobial resistance. Moreover, antimicrobial stewardship is a growing part of Pharmacy Practice research into the rationalisation and the safe use of medicines in targeted populations. Within SDG3 activities, a GCRF-funded collaborative project between the UoA, School of Computing, and Informatics Institute of Technology, Sri Lanka, has over the past 2-years developed and tested a mobile application designed to support the mental wellbeing of the student population. UoA staff also lead a programme of work in collaboration with NHS, NFUS (National Farmers Union Scotland) and several farmers, aimed at enhancing mental wellbeing in the Scottish farming population. To date completion of a systematic review and an exploratory qualitative study, will inform the design of an intervention for future funding.

Contribution of researchers to the economy and the wider community: Key to enriching our strategy is ensuring that outcomes are to the benefit of individuals, communities, and society, and have widespread policy and economic relevance. "Community" is one of the primary pillars of the University's Strategic Plan. RGU and the UoA engages fully with all sections of the community, including the general public; Government; industry, and private and third sectors locally, nationally, and internationally. Researchers in the UoA contribute to specific areas (e.g. healthy ageing; polypharmacy; mental wellbeing in the farming community) of University-wide initiatives such as RGU Orkney (see REF5a). The significance of research in the areas of Pharmacy Practice; Dietary Targets; and on Health, Safety and Performance is described in the UoA associated impact case studies. Below we provide additional selected UoA-specific examples of significant research contribution.

A major new area within the UoA is the revalorisation of waste products from industrial sources (e.g. rape seed pomace, whisky manufacturing, fish production) to produce nutraceuticals; alternative biodegradable plastics; novel textiles; feedstock for insect farming; and high value products for the Food & Drink Industry, both nationally and internationally. This work impacts hugely on the economy, the environment and society by providing a framework for the management and conversion of by-products; the creation of new marketable products to maximise value from the supply chain; reducing disposal to land fill; and supporting the transition to a circular economy paradigm, in line with Scottish Government ZERO WASTE plan.

The Ageing Network (AN) was established by ***Kydd*** and ***Grant*** to drive innovative and impactful research to meet the needs of older people, practitioners and the third sector and aligns fully with national policy. The AN was established as a forum for those involved in research and/or service improvement for older people to come together and generate creative ideas. Seventy members from the Schools at RGU; multi-disciplinary clinicians from NHS Grampian and Tayside; staff from the Health and Social Care Partnerships; the third sector and interested members of the local community aged 60 and over participate. During the COVID-19 pandemic, online support and discussion sessions assisted older people experiencing isolation and loneliness.

Public/patient participation and involvement (PPI), from inception of research ideas to ensuring reach and impact, is embedded in our work and helps to guide both project development and to empower participants. PPI underpins studies about rehabilitation and experiences of long-covid; food security and disadvantage; care experienced young people, and community-based organisations seeking to build resilience and food security in informal settlements, among others. Findings from these studies inform health and social care practice and educational, professional and community development. Moreover, PhD students thread PPI through their studies as appropriate.

Working collaboratively with the wider community is a fundamental philosophy of the UoA. This includes arranging a community seminar series and public lectures; facilitating knowledge exchange with local businesses and charities; and delivering Outreach activities at local events. The Unit promotes engagement and sharing of knowledge through a Community Seminar Series initiated in 2019 with diverse topics including Black Lives Matter, COVID-19 in the city, military veterans and Mumsnet. The aim of reaching the local community saw most event attendees initially based in Aberdeen and Scotland. However, with the shift to online events, the global range of stakeholders is now reflected in participation from across Africa, Asia, Europe, and North America.

Colleagues in the UoA work closely with Aberdeen Science Centre (ASC), to bring STEM subjects to all members of the local and national community. ASC has recently benefited from a £6m award to transform the Centre (the first science centre to be established in Scotland) and to provide the community with a “Lifetime with Science”. ASC has a vibrant Outreach programme, particularly aimed at more deprived community areas locally, but also reaching into the Highlands & Islands. UoA researchers and students support ASC by acting as Life Science STEM ambassadors; on site educators (workshops and displays); and within expert working groups (Content and Funding). Key areas related to the UoA include education on a healthy diet, global food security and sustainability. In response to the COVID-19 pandemic, colleagues within the UoA provided online educational support (STEM videos) for ASC to disseminate to their stakeholders. Additionally, the Group maintains a strong partnership with a local cancer charity Cancer Link Aberdeen & North (CLAN) which supports cancer patients across the NE and the Highlands & islands of Scotland. Several workshops providing nutritional education support to patients diagnosed with or recovering from cancer (and their carers), have been co-produced with colleagues at CLAN.

In conclusion, within this UoA, innovative national and international research is driven by leading researchers who seek to positively impact human health and wellbeing across all community groups. This research is carried out within a thriving physical and supportive environment.