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# Change and Sustainability in Healthcare Quality: the Future Challenges

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ISQUA16-1201 - PATIENT-PROVIDER DISCONNECT: A QUALITATIVE EXPLORATION OF UNDERSTANDING AND PERCEPTIONS TO CARE INTEGRATION IN SINGAPORE

ISQUA16-2316 - IS THERE A RELATIONSHIP BETWEEN EARLY UNPLANNED RETURN TO THEATRE AND THREE-YEAR REVISION RATES FOR ELECTIVE HIP AND KNEE REPLACEMENT SURGERY?

ISQUA16-2603 - HALVING BROKEN HIP IN HOSPITAL – THE NEW ZEALAND EXPERIENCE

ISQUA16-1962 - THE 6-PACK PROGRAM TO DECREASE FALL INJURIES IN ACUTE HOSPITALS: A CLUSTER RANDOMISED CONTROLLED TRIAL

ISQUA16-3108 - IMPROVEMENT SCIENCE TO EVALUATE PERSON-CENTRED AND INTEGRATED CARE: AN INTERNATIONAL COMPARISON

ISQUA16-2735 - HOSPITAL VARIATIONS IN POSTOPERATIVE SEPSIS AND RELATED OUTCOMES AFTER CORONARY ARTERY BYPASS GRAFTING SURGERY

ISQUA16-1828 - EVALUATION FRAMEWORK FOR PATIENT SAFETY INCIDENT REPORTING SYSTEMS

ISQUA16-1154 - ANALYSIS OF AN EXTERNAL EVALUATION PROJECT IN ARGENTINE PUBLIC MATERNITY HOSPITALS

ISQUA16-1337 - MANUAL CLEANING OF ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY ENDOSCOPES USING REMOTE VIDEO AUDITING

ISQUA16-1324 - STANDARD RISK SCREENING AND ASSESSMENT TOOLS USED TO PREVENT HARM TO OLDER PEOPLE IN HOSPITAL

ISQUA16-2346 - A COLLABORATIVE CROSS-COUNTRY STUDY TO MEASURE THE IMPACT OF ELECTRONIC MEDICATION MANAGEMENT SYSTEMS

ISQUA16-1327 - ESTIMATING THE EFFECTS OF FALL PREVENTION INTERVENTIONS BY ADJUSTING FOR THE RISK OF FALLING WITH A PROPENSITY SCORE

ISQUA16-2073 - IMPLEMENTING EXTERNAL ELECTRONIC MEDICATION RECORDS TO PROMOTE EFFECTIVE HOSPITAL MEDICATION RECONCILIATION

ISQUA16-2356 - A NATIONAL SCHEME TO ENSURE MEDICATION SAFETY: THE NATIONAL CERTIFICATION SYSTEM FOR COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE) IN FRANCE

ISQUA16-2082 - INTERGRATION OF QUALITY CONTROL CIRCLE AND PHS WIN-WIN CONCEPT TO PROMOTE

THE MEDICAL QUALITY OF HEMATOPOIETIC MALIGNANCIES

ISQUA16-2831 - EFFECTIVENESS OF INFECTION CONTROL FOR PREVENTING CATHETER-ASSOCIATED BLOODSTREAM INFECTION

ISQUA16-1513 - WHAT ARE JUNIOR MEDICAL DOCTORS IN ETHIOPIA ACTUALLY DOING: USING EVIDENCE GENERATED FROM TASK ANALYSIS STUDY TO STRENGTHEN MEDICAL PRACTICE, EDUCATION AND REGULATION

ISQUA16-2548 - WHAT WOULD IT TAKE FOR ACCREDITATION TO BE COST-EFFECTIVE? A THRESHOLD ANALYSIS CASE STUDY

ISQUA16-2703 - THE ASSOCIATION BETWEEN WEEKEND/WEEKDAY IN-HOSPITAL MORTALITY AND CENTRALISATION OF STROKE SERVICES

ISQUA16-1960 - HEALTHCARE SERVICES UTILIZATION FOLLOWING ADMISSION FOR HIP FRACTURE IN PATIENTS OLDER THAN 65 YEARS

ISQUA16-1366 - HIP FRACTURE MORTALITY BY TEACHING STATUS OF TREATING HOSPITAL

ISQUA16-1655 - THE EFFECT OF DEMENTIA ON MEDICAL CARE IN MIDDLE-AGED AND ELDERLY PATIENTS WITH DIABETES MELLITUS IN TAIWAN

ISQUA16-2853 - ANALYSIS OF PATIENT SAFETY INCIDENTS IN BRAZILIAN ACCREDITED HOSPITALS - THE SAFETY SENTINEL PROJECT

ISQUA16-1476 - RESILIENCE AND DEPRESSION SYNERGICALLY AFFECT SELF-CARE MAINTENANCE OF HEART FAILURE

ISQUA16-1195 - EVALUATION OF TEAM TRAINING IMPACT ON SURGICAL OUTCOMES: A CLUSTER RANDOMIZED TRIAL

ISQUA16-2258 - IMPLICATIONS FROM CASE STUDIES AND UPDATING PROGRAMS IN THE TEAMSTEPS TRAININGS IN JAPAN

ISQUA16-2772 - FORETHOUGHT ON THE END OF LIFE: USING SIMULATION TO IMPROVE COMMUNICATION SKILLS WITH END-OF-LIFE PATIENTS AND THEIR FAMILIES IN HOSPITALS OF CLALIT HEALTH SERVICES

ISQUA16-3180 - THE IMPACT OF AN INNOVATIVE PATIENT-CENTERED CARE MODEL ON PATIENT AND FAMILY EXPERIENCE IN ACUTE CARE

ISQUA16-2578 - CAN PATIENT INVOLVEMENT IMPROVE PATIENT SAFETY? A CLUSTER RANDOMIZED CONTROL TRIAL OF THE PATIENT REPORTING AND

ACTION FOR A SAFE ENVIRONMENT (PRAISE)  
INTERVENTION

ISQUA16-2368 - THE EFFECT OF A PATIENT CENTRED  
CARE BUNDLE INTERVENTION ON PRESSURE ULCER  
INCIDENCES (INTACT)

ISQUA16-2418 - FAMILY AND CAREGIVERS ARE AN  
INTEGRAL PART OF HOME CARE SAFETY

ISQUA16-2352 - STREAMING QUIET TIME TO ENSURE  
ADEQUATE REST FOR PATIENTS

ISQUA16-2496 - CARE ACROSS THE CONTINUUM:  
SUPPORTING WOMEN CONCERNED ABOUT BREAST  
CANCER IN GENETICS AND ONCOLOGY SETTINGS

ISQUA16-1722 - PREDICTING PEDIATRIC  
READMISSIONS

ISQUA16-2242 - GOT PILLS? A PHARMACIST'S IMPACT  
ON CHRONIC DISEASE AND OLDER ADULTS IN  
TRANSITIONS OF CARE

ISQUA16-3152 - COORDINATING CARE ACROSS THE  
CONTINUUM BY MANAGING POST DISCHARGE  
TRANSITIONS AT HOME

ISQUA16-1142 - IS READMISSION POLICY PENALISING  
HOSPITALS FOR KEEPING PEOPLE ALIVE?

ISQUA16-2008 - IMPROVING EFFICIENCY IN  
HEMATOLOGY LABORATORY

ISQUA16-2413 - THE IMPACT OF NEW PAYMENT  
MODELS ON CARE DELIVERY: REDUCTIONS IN  
EMERGENCY CARE USE AMONG BENEFICIARIES IN A  
MEDICARE PIONEER ACO

ISQUA16-1936 - THE COST OF QUALITY TO PATIENTS:  
THE IMPACT OF SURGICAL COMPLICATIONS ON  
WELLBEING.

ISQUA16-1524 - IMPACT OF AGE AND RENAL FUNCTION  
ON INCIDENCE OF ADVERSE DRUG EVENT: THE JADE  
STUDY

ISQUA16-2875 - THE BRAZILIAN PATIENT SAFETY  
PROGRAM - BUILDING A NETWORK TO HELP  
BRAZILIAN HOSPITALS TO IMPROVE QUALITY OF  
CARE OFFERED TO THE POPULATION

ISQUA16-1658 - EXPLORING LATENT TEACHING STRESS  
AND COPING PROFILES AMONG CLINICAL TEACHERS  
AND EXAMINING ASSOCIATIONS

ISQUA16-2946 - FEASIBILITY OF POST DISCHARGE  
FOLLOW-UP CALL TO UROLOGY PATIENTS AT A  
PRIVATE TERTIARY CARE HOSPITAL IN KARACHI

ISQUA16-2520 - EDUCATING PHYSICIANS FROM THE  
CLASSROOM TO THE CLINIC

ISQUA16-2682 - CHILDREN'S CARE PATHWAY AND  
PARENTAL EXPERIENCES FOLLOWING USE OF NHS  
111, A NON-EMERGENCY MEDICAL HELPLINE IN  
ENGLAND.

ISQUA16-1955 - USING ROUTINELY COLLECTED  
ADMINISTRATIVE DATA TO FURTHER EXAMINE  
VARIATION IN OBSTETRIC OUTCOMES BY DAY OF THE  
WEEK

ISQUA16-1575 - AUTOMATED IDENTIFICATION OF  
TRIGGERS FROM THE GLOBAL TRIGGER TOOL IN  
ELECTRONIC HEALTH RECORDS

ISQUA16-2575 - A MIXED METHODS INVESTIGATION  
OF THE EFFICACY OF ORGANISATIONAL LEVEL  
FEEDBACK FROM INCIDENT REPORTING

ISQUA16-1878 - ARE STATISTICAL NATURAL LANGUAGE  
PROCESSING MODELS FOR PNEUMONIA  
SURVEILLANCE GENERALIZABLE ACROSS ACUTE  
CARE HOSPITALS?

ISQUA16-2069 - OUR JOURNEY TOWARDS EXCELLENCE:  
AN ANALYSIS OF EFFORTS MADE TO ENSURE  
CONTINUOUS CARE BY PROVIDING MEDICAL  
RECORDS

ISQUA16-3178 - HOSPITAL HEALTH SERVICE QUALITY  
AND UNIVERSAL HEALTH CARE IN INDONESIA

ISQUA16-2820 - NARROWING THE GAP: HOSPITAL  
ACCREDITATION AND INEQUALITY IN SOUTH AFRICA

ISQUA16-3013 - EVOLUTION OF THE QUALITY OF CARE:  
AN INVESTIGATION INTO HOSPITAL PERFORMANCE  
AND THE ROLE OF ACCREDITATION IN SOUTH  
AFRICA

ISQUA16-2904 - "BEYOND PROJECTS" – A SYSTEMIC  
APPROACH TO IMPROVING QUALITY, PATIENT-  
FOCUSSED CARE

ISQUA16-2255 - THE HOSPITAL AT NIGHT TEAM  
NURSING MODEL OF CARE

ISQUA16-3135 - MEASURING PATIENT SAFETY USING  
CLINICAL REGISTRIES – OPPORTUNITIES AND AREAS  
FOR IMPROVEMENT

ISQUA16-2464 - HOW PATIENTS-AS-PARTNERS CAN  
HELP INCREASE PATIENT SAFETY AT THE BEDSIDE

ISQUA16-1646 - HOW TO ACHIEVE SAFETY  
EXCELLENCE ON ELDERLY MEDICAL WARDS: A  
POSITIVE DEVIANCE APPROACH

ISQUA16-3062 - IMPROVEMENTS IDENTIFIED, BUT FUTURE SUSTAINABILITY IS NOT ASSURED: STAKEHOLDERS' VIEWS ON ACCREDITATION IN AUSTRALIAN GENERAL PRACTICES

ISQUA16-1278 - THE DIFFERENCES OF STRENGTHS BETWEEN SUBGROUPS OF ACUTE CARE HOSPITALS IN ACCREDITATION SURVEY RESULT IN JAPAN

ISQUA16-2335 - PATIENT SAFETY'S MISSING LINK: USING CLINICAL EXPERTISE TO RECOGNIZE, RESPOND TO AND REDUCE RISKS AT A POPULATION LEVEL

ISQUA16-2674 - THE ACCREDITATION CANADA PROGRAM: FACILITATING INTEGRATION ACROSS A HEALTH SYSTEM AND THE CONTINUUM OF CARE

ISQUA16-2589 - FRENCH ON-LINE INITIATIVE TO MEASURE PATIENT'S EXPERIENCE FOR IMPROVEMENT OF THE QUALITY OF CARE

ISQUA16-2483 - RANDOMIZED TRIAL OF A PERSONALIZED MULTI-CONDITION RISK ASSESSMENT IN PRIMARY CARE

ISQUA16-1136 - IMPROVING ACCESS AND OUTCOMES IN COMMUNITY PSYCHOLOGICAL THERAPIES

ISQUA16-1444 - DEVELOPING A PATIENT-LED ELECTRONIC FEEDBACK SYSTEM FOR QUALITY AND SAFETY WITHIN AN EXISTING ELECTRONIC HEALTH RECORD

ISQUA16-1897 - DOCUMENTATION OF PATIENT COMMUNICATION IN HOSPITAL MEDICAL RECORDS: A PROTECTION OR A THREAT TO PATIENT SAFETY FOR ADULTS WITH COMMUNICATION DISABILITY

ISQUA16-1576 - CARE PATHWAYS' ASSESSMENT FOR IMPROVEMENT: THE FRENCH EXPERIENCE ON MYOCARDIAL INFARCTION WITH ST ELEVATION (STEMI)

ISQUA16-2502 - ISRAEL'S ELDERLY POPULATION: DO THEY RECEIVE HIGH QUALITY CARE?

ISQUA16-2493 - CARE IN THE ETHER - DEVELOPING A ROBUST CLINICAL REVIEW METHOD FOR TELEHEALTH

ISQUA16-2572 - AN INTEGRATED TOOL FOR EVALUATING THE FRENCH MANDATORY QUALITY INDICATORS USED FOR HOSPITAL IMPROVEMENT, PUBLIC DISCLOSURE AND REGULATION

ISQUA16-2984 - COMPUTER AIDED QUALITY ASSURANCE IN THE PLANNING OF THE SURGICAL PATHWAY

ISQUA16-3132 - EFFECTIVENESS OF THREE INTERVENTION PROGRAMS DESIGNED TO IMPLEMENT WHO SAFE CHILDBIRTH CHECKLIST IN COLOMBIA

ISQUA16-1697 - AN OBSERVATION AUDIT TOOL FOR NURSE-TO-NURSE BEDSIDE CLINICAL HANDOVER

ISQUA16-2509 - QUALITY AND SAFETY IN THE OLDER PERSON'S UNIT: A RESILIENCE ENGINEERING APPROACH

ISQUA16-1718 - IMPROVING SEVEN-DAY POST-OPERATIVE FOLLOW-UP RATE AT IGANGA ISLAMIC MEDICAL CENTER IN UGANDA

ISQUA16-2321 - SPEAKING UP FOR PATIENT SAFETY SURVEY

ISQUA16-2687 - EXPERIENCES OF IMPLEMENTING OCCUPATIONAL HEALTH SERVICES DRIVEN INTERVENTION METHODS FOR SUSTAINABLE LEADERSHIP IN HEALTH CARE

ISQUA16-2887 - PATIENTS' STORIES: CAN THIS INSIDER VIEW BE USED TO SUPPORT MEDICATION ADHERENCE IN KIDNEY TRANSPLANTATION?

ISQUA16-1963 - MENTORING AND EDUCATION TO IMPROVE CONFIDENCE OF STAFF CARING FOR PEOPLE WITH DEMENTIA IN ACUTE HOSPITALS

ISQUA16-2622 - EFFECTIVENESS OF IMPLEMENTING THE SMOKE-FREE HOSPITALS PROGRAM IN IMPROVING QUALITY

ISQUA16-3009 - UNDERGRADUATE STUDENTS PERCEPTIONS AND SATISFACTION WITH THE QUALITY OF THE INTEGRATED MEDICAL CURRICULUM

ISQUA16-2645 - PATIENT EMPOWERMENT THROUGH HEALTHCARE UNIT ACCREDITATION PROCESS

ISQUA16-2526 - GOVERNANCE STANDARDS FOR ABORIGINAL HEALTH SERVICES - A COLLABORATIVE JOURNEY

ISQUA16-2476 - IMPROVING THE SAFETY AND QUALITY OF HEALTH CARE FOR ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE USING THE AUSTRALIAN NATIONAL SAFETY AND QUALITY HEALTH SERVICE STANDARDS

ISQUA16-1522 - QUALITY AND PREDICTORS OF DIABETES CARE AMONG PATIENTS WITH SCHIZOPHRENIA

ISQUA16-2943 - THE COMPREHENSIVE COST OF ILLNESS OF FRACTURE IN JAPAN

ISQUA16-2769 - SOMETIMES LESS IS MORE! MANAGING WISELY LABORATORY TESTS AMONG HOSPITALIZED PATIENTS

ISQUA16-3153 - THE IMPLICATIONS OF VARIATION IN RISK ADJUSTED COST OF CARE OF HOSPITALIZED PATIENTS ON COMPLICATIONS, COST, LENGTH OF STAY, AND READMISSION WITHIN 30 DAYS

ISQUA16-2861 - UNDERTAKING LARGE-SCALE RESEARCH IN AUSTRALIA: ENCOUNTERING THE COMPLEX WEB OF ETHICS AND GOVERNANCE IN HOSPITALS AND HEALTH SERVICES

ISQUA16-1369 - NATIONAL GUIDELINES FOR SPIRITUAL CARE IN AGED CARE

ISQUA16-1473 - PATIENT-CENTRED MEASUREMENT OF EXPERIENCES AND OUTCOMES OF CARE IN BRITISH COLUMBIA, CANADA: STATISTICS WITHOUT THE TEARS WIPED OFF

ISQUA16-2690 - IMPROVING CARE AND CHOICE AS MOTOR NEURONE DISEASE PROGRESSES

ISQUA16-1920 - USING A NEW PATIENT FEEDBACK SURVEY TO EXPLORE EXPERIENCES OF LIVING WITH SICKLE CELL DISEASE IN THE UK

ISQUA16-2431 - HOW NATIONS COMPARE: BENCHMARKING USE OF INFORMATION TECHNOLOGY TO IMPROVE CARE

ISQUA16-1862 - A MOBILE DATA-DRIVEN SAFETY AND QUALITY SYSTEM FOR VOLUNTARY MEDICAL MALE CIRCUMCISION (VMMC) IN MOZAMBIQUE

ISQUA16-1665 - HOSPITAL INFORMATION TECHNOLOGY INFRASTRUCTURE AFFECTS QUALITY OF CARE

ISQUA16-2381 - DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGY IN HEALTHCARE: SOCIODEMOGRAPHIC ASPECTS ON QUALITY AND SAFETY OF CARE

ISQUA16-2889 - THE POST-DISCHARGE LONG-TERM MORTALITY AND CARE BURDEN AMONG ELECTIVE SURGICAL PATIENTS WITH POSTOPERATIVE SEPSIS

ISQUA16-1953 - GEODEMOGRAPHIC ASPECTS OF PRIMARY CARE ACCESS: THE CZECH REPUBLIC

ISQUA16-1279 - JOINING UP THE CONTINUUM FROM CANCER SERVICES TO FAMILY PRACTICE THROUGH IMPROVED COMMUNICATION

ISQUA16-1909 - THE AFTERMATH OF MEDICAL ERRORS: SUPPORTING OUR SECOND VICTIM COLLEAGUES

ISQUA16-2863 - ASSESSING THE LONGITUDINAL IMPACT OF SAFETY AND QUALITY REFORMS: AN ANALYSIS OF THE ACHS PILOT ACCREDITATION PROGRAM IN HONG KONG

ISQUA16-2955 - HOME TELEMONITORING FOR AGED CARE – DO THE ELDERLY COMPLY AND COMPLETE?

ISQUA16-2364 - ASSESSING THE PILLARS OF LIFE QUALITY FOR LONG-TERM CARE CLIENTS IN RESIDENTIAL AND COMMUNITY CONTEXTS

ISQUA16-3191 - WHAT CAN BE LEARNED FROM THE IMPLEMENTATION OF A PAY FOR PERFORMANCE PROGRAMME?

ISQUA16-2096 - PERSON- AND FAMILY CENTRED CRISIS ASSESSMENT AND HOME TREATMENT SERVICES IN MENTAL HEALTH CARE

ISQUA16-1531 - LONGITUDINAL ADHERENCE TO A NATIONAL SCREENING PROGRAM FOR EARLY DETECTION OF COLORECTAL CANCER IN ISRAEL

ISQUA16-2683 - IMPROVING THE QUALITY AND SAFETY OF THE CONSULTATION AND REFERRAL PROCESS: IT'S MORE THAN PROFESSIONALISM AND COLLEGIALLY

ISQUA16-1363 - UTILIZING ELECTRONIC HEALTH RECORD DOCUMENTATION TO MEASURE VALUE FOR PROSTATE CANCER CLINICAL CARE

ISQUA16-2322 - PRACTICE-DRIVEN RESEARCH IN AGED CARE NURSING

ISQUA16-2662 - WILLINGNESS TO USE INTERNET-BASED CHANNELS TO COMMUNICATE WITH DOCTORS AMONG CITIZENS IN SPAIN

ISQUA16-1699 - THE EFFECT OF COMMUNITY PSYCHIATRIC REHABILITATION INSTITUTION ACCREDITATION IN TAIWAN

ISQUA16-1995 - A TALE OF TWO EVALUATIONS: THE QUALITY ACCOUNT AND THE ACCREDITATION SURVEY

ISQUA16-3059 - HEALTH INFORMATION EXCHANGE SYSTEMS AND LENGTH OF STAY IN READMISSIONS TO A DIFFERENT HOSPITAL

## ISQUA16-1201 PATIENT-PROVIDER DISCONNECT: A QUALITATIVE EXPLORATION OF UNDERSTANDING AND PERCEPTIONS TO CARE INTEGRATION IN SINGAPORE

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**Objectives:** Integrated care has been well-recognized as a solution to improve quality of care and quality of life for patients with complex, long-term problems cutting across multiple services, providers, and settings. As Singapore's healthcare system increasingly adopts integrated models of care, it is unclear if providers, patients and caregivers share adequate and similar understanding of such development. This study aims primarily to assess understanding and perception of care integration among various key healthcare stakeholders (providers, patients, caregivers, administrators) in Singapore. Secondary objectives were to identify challenges and expectations in implementing care integration.

**Methods:** This qualitative study was conducted among 41 healthcare providers, patients and caregivers in Singapore using 29 semi-structured interviews and 2 focus group discussions. Study participants were selected by purposive convenience sampling from various clinical settings. Topic guides were designed and pre-tested. All data collection sessions were audio-recorded. Data were transcribed, familiarized, coded and analyzed by thematic analysis.

**Results:** Understanding of care integration was generally lacking among patient and caregivers. Most views were narrowly focusing on costs and accessibility of services. Awareness about emerging healthcare trends and government initiatives such as setting up of regional health systems were low. Beyond low health literacy, the observation might also be contributed by low recognition of misinformation and low urgency for action among the public. Among healthcare providers, the perceptions and definitions varied according to different occupational exposures, experience and responsibilities. Senior clinicians and managers seemed to have appreciable knowledge of the concept not seen among juniors and mid-level staff, though some of whom were directly involved in patient care or transitional care programs in the institutions. Importance of individual roles in the care integration process was often under-recognized. Instead, there seemed to be a prevalent perceived inadequacy in healthcare resources, and reliance on state provisions especially among patients and caregivers as many repeatedly suggested resources the government ought to commit for their healthcare. This may also reflect an underlying lack of self-efficacy in managing one's own health.

**Conclusion:** The transformation of our healthcare system from a specialized, episodic model in the past to an integrated, longitudinal model for the future requires stakeholders, including patients and caregivers, to work together. Underpinning such

effort should be a common understanding and a shared direction, both of which are currently not in place. Our healthcare consumers today lack the fundamental understanding in how our healthcare system works, and care integration is nothing but an alien concept to most of them. While our healthcare providers generally recognized the need for integration of services, the understanding and priorities also seemed to be varied. There is an urgent need for the policymakers to look into this matter, facilitate public discussions, raise awareness and health literacy among the population.

## ISQUA16-2316 IS THERE A RELATIONSHIP BETWEEN EARLY UNPLANNED RETURN TO THEATRE AND THREE- YEAR REVISION RATES FOR ELECTIVE HIP AND KNEE REPLACEMENT SURGERY?

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**Objectives:** Revision of joint replacement is the most widely used outcome measure in elective hip and knee surgery. Unplanned return to theatre (RTT) has been proposed as an additional outcome measure in surgery and has been developed for orthopaedics [1], but its relation with revision is unknown. We compared 90-day RTT and three-year revision rates for hip and knee arthroplasty: what does each measure tell us about surgeon performance that the other does not?

**Methods:** National hospital administrative data for England were used to compare RTT at 90 days (RTT90) with revision rates within 3 years by surgeon. Statistical methods included multilevel modelling, correlation and funnel plots.

**Results:** From 2006 to 2011, there were 297,650 hip replacements (HR) among 2,952 surgeons and 341,226 knee replacements (KR) among 2,343 surgeons. RTT90 rates were 2.1% for HR and 1.5% for KR; three-year revision rates were 2.1% for HR and 2.2% for KR. An RTT90 was associated with a 10-27% chance of a later revision within three years and was highest for revisions within 90 days of a KR. There was an association between both measures and several patient characteristics including: male sex, socioeconomic deprivation, previous emergency admissions, pulmonary circulation disorders, Parkinson's disease, other neurological conditions, obesity, and mental health conditions.

The correlation between the risk-adjusted surgeon-level rates for the two outcomes was +0.51 for HR and +0.20 for KR, both  $p < 0.001$ . There was little agreement between the measures regarding which surgeons had significantly high or low rates on funnel plots.

**Conclusion:** RTT90 appears to provide useful and complementary information on surgeon performance and should be considered alongside revision rates. Patients who have had any RTT90 are much more likely to have further complications and warrant more rigorous follow-up.

## References

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## ISQUAI6-2603

## HALVING BROKEN HIPs IN HOSPITAL – THE NEW ZEALAND EXPERIENCE

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**Objectives:** The Health Quality & Safety Commission (the Commission), in partnership with the Accident Compensation Corporation and the Ministry of Health, is leading a national quality improvement programme to reduce harm from older people falling in care settings - hospital, aged residential care and receiving care at home.

**Methods:** National Serious Adverse event reporting identified in the early 2010s that falls, and in particular falls associated with fractured neck of femur, were the most commonly reported adverse event in New Zealand hospitals. The Commission established a national Reducing Harm from Falls Programme in 2012 in response.

Rather than a “bundle” of care practices, the programme has followed the philosophy of applying the right combination of interventions that address the specific risks of the individual, basing these on multiple robust, evidence-based interventions. The programme developed a suite of interactive and evidence-based resources, titled “the 10 Topics” to build capability of health professionals. A Falls Atlas of Healthcare Variation was also developed to show national and local data and to inform and guide local improvement.

Reducing Harm from Falls is profiled every April under the banner of “April Falls” providing a reason for healthcare providers to refocus on the problem of and celebrate and share their successes in reducing harm.

A “quality and safety marker” was established, linking measures of implementing process changes with outcomes, based on the Donabedian model. The process measure is the percentage of patients aged 75 and older given a falls risk assessment, and the percentage provided with an individualised care plan. The outcome measure is the number of hospital falls resulting in a fracture entering hospital aged 75+ who were assessed for the risk of falling increased from 76% at baseline (February 2013) to 92% in September 2015.

Likewise, the proportion of patients assessed as at risk of falling who received an individualised care plan also increased from 80% (September 2013) to 92% in September 2015.

A significant sustained reduction in hospital falls associated with a fractured neck of femur has been achieved from November

2014 onwards. Between the start of the programme and September 2015 there have been 37 fewer falls with a fractured neck of femur than would have been expected based upon the underlying rate between July 2010 and June 2012. This is a 35 per cent reduction ( $p = .003$ ).

Based on the New Zealand Institute of Economic Research (NZIER) 2010 estimate of \$47,000 per hip fracture incident, this reduction conservatively represents a saving to the health system of \$1.8 m. If 20 per cent of those incidents would have resulted in transfer to aged residential care, NZIER estimates would mean a saving of \$2.4 m.

**Conclusion:** A comprehensive, integrated quality improvement programme approach has resulted in a statistically significant reduction in in-patient falls with a fractured neck of femur in New Zealand public hospitals.

## References

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## ISQUAI6-1962

## THE 6-PACK PROGRAM TO DECREASE FALL INJURIES IN ACUTE HOSPITALS: A CLUSTER RANDOMISED CONTROLLED TRIAL

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**Objectives:** Patient falls remain a common cause of harm in acute hospitals worldwide. Epidemiological studies provide evidence that harm from in-hospital falls is increasing. Additionally, a recent Cochrane review concluded that more trials are needed to confirm the effectiveness of multifactorial interventions in the hospital setting. The aim of this trial was to evaluate the effect of the 6-PACK program on fall and fall injuries in acute hospital wards.

**Methods:** This cluster randomised controlled trial included all patients on 24 acute medical and surgical wards across six Australian hospitals as trial participants. Participating wards were assigned to receive either the nurse-led 6-PACK program or usual care over a 12-month period. The 6-PACK program included a validated nine-item falls risk tool and six interventions: ‘falls alert’ sign; supervision of patients in the bathroom; ensuring patients’ walking aids are within reach; establishment of a toileting regime; use of a low-low bed; and use of a bed/chair alarm. The co-primary outcomes were falls and fall injuries per 1,000 occupied bed days.

**Results:** During the study period there were 46,247 admissions to the study wards. This represented 35,264 individuals. Characteristics of patients and length of stay were similar for intervention and control wards during the study period. High levels of

implementation of the 6-PACK program were achieved. There were 1,831 falls and 613 fall injuries, and the rate of falls (incidence rate ratio [IRR] = 1.04, 95% confidence interval [CI], 0.78 to 1.37; P=0.796) and fall injuries (IRR, 0.96; 95% CI, 0.72 to 1.27; P=0.766) were similar in intervention and control wards.

**Conclusion:** The 6-PACK program had no effect on falls or fall injuries above that achieved with usual care. Whilst the substantial harm of inpatient falls is unquestionable, there remains an absence of high-quality evidence showing the effectiveness of preventative strategies.

### ISQUIA16-3108 IMPROVEMENT SCIENCE TO EVALUATE PERSON-CENTRED AND INTEGRATED CARE: AN INTERNATIONAL COMPARISON

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**Objectives:** According to the World Health Organization, a disconnection exists between how person-centred and integrated care is commonly conceptualized and its evidence-base to date, which is focused on more narrowly defined interventions (WHO, 2015). Theory-driven, formative evaluations are advised as well as evaluation of the full path of an improvement strategy (Parry et al., 2013). The objective of our study was to assess whether ongoing evaluation efforts of person-centred, integrated care are suited to answer the question: how and in what contexts does integrated care work or can be refined and who is it suitable for?

**Methods:** Large scale evaluations of person-centred, integrated care programmes in England, the Netherlands, Singapore, and the USA were compared. This was done by scoring the evaluations according to eight items, mostly derived from the DISMEVAL project (Developing and validating DISease Management EVALuation methods, funded under the EC 7<sup>th</sup> Framework Programme). These items include: involvement of patients in evaluator team, comprehensiveness of selected evaluation dimensions, study designs, length of study, quality of data, data analysis techniques, analysis of bias, contextual interpretation of results. Data were collected from documents outlining the design, methods and techniques applied to evaluate the programmes. Data were analysed qualitatively.

**Results:** Ongoing, large-scale evaluations of integrated care in England (vanguards, integrated care pilots), the Netherlands (population health management pilots), Singapore (regional health systems) and the US (state innovation models) all make use of wide sets of dimensions and study designs which support mixed methods and multi-level and multi-stakeholder analyses. Patients do not seem to be involved in the evaluation of integrated care other than data carrier. Major challenges are faced with assuring the quality of data (e.g. response and completion rates, sample size, number of measurements), the analysis of data (e.g. multi-level, triangulation), the analysis of bias (e.g. lack of comparator, confounders), and the

contextual interpretation of results (e.g. local vs national policy, changing network of stakeholders).

**Conclusion:** Ongoing, large scale evaluations seem to fit the width and depth of integrated care improvement strategies. However, these evaluations are faced with major challenges because of their more holistic and flexible nature. Evaluators should further improve their work by including patients in their teams, interacting with stakeholders whilst preparing and conducting the evaluation, and collaborating with evaluators from other countries to tackle challenges together.

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### ISQUIA16-2735 HOSPITAL VARIATIONS IN POSTOPERATIVE SEPSIS AND RELATED OUTCOMES AFTER CORONARY ARTERY BYPASS GRAFTING SURGERY

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**Objectives:** To assess hospital variations in the incidence rates of sepsis and sepsis related deaths, sepsis case fatality, overall in-hospital mortality and 30-day post-discharge mortality, as well as readmission within 28 days after discharge among elective surgical patients who underwent coronary artery bypass grafting (CABG) in New South Wales (NSW), Australia.

**Methods:** We selected elective surgical patients who underwent CABG surgery performed in 9 public acute hospitals (all principal referral hospitals) and in 12 private hospitals (7 major, 2 district and 3 community) in NSW from 2007 to 2013 using the state-wide Admitted Patient Data Collection records linked with the NSW Registry of Births, Deaths, and Marriages. Following the inclusion criteria and the definition of “postoperative sepsis” developed by the Agency for Healthcare Research and Quality, we derived the outcome using 54 non-principal diagnostic fields in patient medical records. We targeted elective surgical patients aged  $\geq 18$  years and stayed in the hospital more than 3 days, and excluded those who were principally diagnosed with sepsis or infection on admission, cases with any-listed ICD-10-AM diagnosis codes for cancer, or cases with any-listed ICD-10-AM diagnosis codes or any-listed ICD-10-AM procedure codes for immunocompromised state. We used Poisson mixed models to derive rate ratios (RR) for each outcome adjusted for patient and hospital characteristics (age, gender, country of birth, marital status, comorbidity and socio-economic status, hospital district (metropolitan and rural)). The comparisons were performed between the public and private hospital groups,



and between the bottom 20% (worst) and top 20% (best) within the two hospital groups.

**Results:** Between 2007 and 2013, 10,868 (53.9%) elective CABG surgery were admitted to public hospitals, and 9,312 (46.1%) to private hospitals. Patients in the public hospitals were younger than patients in private hospitals (65 yrs vs 67 yrs,  $P < 0.001$ ), and had less proportion male patients. Between the two hospital groups, both of the incidence rates of sepsis and sepsis related deaths in the public hospitals were twice times the incidence rates in the private hospitals (sepsis: 24.9 vs 12.8 per 1,000 admissions; adjusted RR=1.73, 95%CI: 1.23-2.42; sepsis related deaths: 5.0 vs 2.5 per 1,000 admissions; adjusted RR=1.81, 95%CI: 1.06-3.08). There was no significant difference in sepsis cases fatality between the two hospital groups. The higher rate of overall in-hospital mortality was observed in public hospitals compared with private hospitals (14.7 vs 6.4 per 1,000 admissions, adjusted RR=1.74, 95%CI: 1.00-3.03), but similar rates showed in 30-day post-discharge mortality. Within the public hospital group, between the worst and the best quintiles, there were significant differences in the sepsis incidence rate (42.4 vs 15.5 per 1,000 admissions; adjusted RR=1.18, 95%CI: 1.07-1.30), the incidence rate of sepsis related deaths (7.8 vs 1.2 per 1,000 admissions; adjusted RR=1.34, 95%CI: 1.06-1.69), and overall in-hospital mortality rate (21.2 vs 6.6 per 1,000 admissions; adjusted RR=1.15 (1.00-1.31). Within the private hospital group, there was only significant difference in the incidence rate of sepsis related deaths between the worst and the best quintiles (5.6 vs 1.0 per 1,000 admissions, adjusted RR=1.49, 95%CI: 1.07-2.07).

**Conclusion:** Significant hospital variation exists in the incidence of sepsis and sepsis related death, overall in-hospital mortality and 28-day readmission after elective CABG surgery. The public hospital group showed greater variations compared with the private hospital group. Further research is needed to investigate the causes of such variations and to develop necessary policy interventions.

## ISQUA16-1828 EVALUATION FRAMEWORK FOR PATIENT SAFETY INCIDENT REPORTING SYSTEMS

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**Objectives:** Research Question: *What are the indicators of a successful patient safety incident reporting (IR) system, and what framework can be applied to ensure IR systems are evaluated comprehensively?*

Patient safety IR systems operate widely across health systems as mechanisms to improve accountability, facilitate learning and promote a culture of patient safety. Despite the widespread use of IR systems, there is no standard evaluation framework to measure and monitor them to ensure they are achieving their intended goals.

**Objective:** Collate evidence on what makes a successful IR system and devise a tool for evaluating IR systems based on that evidence.

**Methods:** The Web of Science Database was searched for all articles in the last 20 years pertaining to the success of IR systems.

Articles were included if they provided evidence about why an IR system was successful. Articles were excluded if they were not about healthcare, only presented opinions on best-practice in IR, or simply described the theoretical benefits of IR. Following this, snowballing was used to glean additional sources.

The framework for evaluating IR systems was then developed using evidence from the literature about what makes a successful IR system. Indicators of a successful IR system were defined as anything that demonstrably enhanced accountability, learning or patient safety culture. These indicators were grouped into five ascending levels of maturity such that the framework provides a map for IR system evolution. Indicators were then operationalised into specific, measurable questions.

**Results:** The search returned 43 relevant sources. The indicator of success presented in each source fell into one of five groups which correspond to the maturity of an IR system: Readiness & resources (6 sources), Uptake & usage (22 sources), Capturing relevant information (5 sources), Information used (8 sources), Generates learning & improvement (2 sources). The image below depicts the maturity groups and their general indicators (specific, measurable questions for each indicator are also available, but not possible to display).

Maturity Group	Indicator
1. Resources & readiness	<ul style="list-style-type: none"> <li>- Appropriate financial and staff resources</li> <li>- Designed based on user-needs</li> <li>- Objectives clearly articulated</li> <li>- Established culture around safety</li> </ul>
2. Uptake & usage	<ul style="list-style-type: none"> <li>- Training for staff</li> <li>- Clear definitions of what should be reported</li> <li>- Anonymous</li> <li>- Direct feedback loop from manager to reporter</li> <li>- Web-based</li> <li>- Simple reporting platforms</li> </ul>
3. Information Capture	<ul style="list-style-type: none"> <li>- Reports reflect the actual number of IRs</li> <li>- Reports are made in a timely manner</li> <li>- Collaborative reporting to ensure data supports action</li> </ul>
4. Analysis & publication	<ul style="list-style-type: none"> <li>- Data is analysable</li> <li>- Data is understood by staff responsible for acting on it</li> <li>- Managers have immediate access to data</li> <li>- All staff are involved in analysis</li> </ul>
5. Generates Learning & Improvement	<ul style="list-style-type: none"> <li>- Prioritisation of efforts prior to designing improvements</li> <li>- Established system for monitoring improvements</li> <li>- Innovative approaches to engaging staff in improvement</li> </ul>

**Conclusion:** The maturity groups and indicators within them ensures that evaluation of IR systems is not conducted using a single metric, but a multi-dimensional model accounting for all the relevant factors. It is presented in a way that hospitals, or health systems, could scrutinise their IR systems and pinpoint the indicator or broader group of indicators that requires improvement for

the whole system to function better. This evidence-based framework provides both a useful evaluation mechanism for existing IR systems, as well as a guide for building and measuring IR systems in places where they are not established yet.

This study contains no conflict of interest.

#### ISQUAI6-1154 ANALYSIS OF AN EXTERNAL EVALUATION PROJECT IN ARGENTINE PUBLIC MATERNITY HOSPITALS

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**Objectives:** The Undersecretary for Community Health of the National Ministry of Health (MOH) was concerned because forecast data indicated that Argentina would not achieve its Millennium Development Goals (MDGs) 4 and 5, despite the many programs that had been implemented to improve perinatal care. The safety and quality of hospital care impacted the effectiveness of many of these programs. The Undersecretary held a summit meeting in which provincial health ministers recommended a hospital accreditation program to accelerate improvement. As a first step, a project was initiated to determine if external evaluation (EE) would be a feasible methodology for identifying: 1) gaps in safety and quality and 2) improvement priorities based on potential risks to patients. This project was limited to EE and did not study the impact of the EEs on the MDGs.

**Methods:** Standards for EEs were selected based on the MOH's analysis of safety and quality problems, MOH programs, government regulations, recommendations from organizations such as WHO and UNICEF, and national and international accreditation programs. Once approved and field tested, experts assigned a risk-value of 1-10 to standards based on how much non-compliance might negatively impact care. Sampling methodology was used in each hospital, where teams of 4 trained perinatal professionals traced the structures and processes related to the care being experienced by selected mother-child pairs. Tracing consisted of interviews with personnel and patients, walk-arounds, observation, and review of outcome data and medical records. Evaluators focused on processes, not staff performance. They documented findings and scored 300 standards. A spreadsheet then multiplied each score by its predetermined risk value, automatically prioritizing high risk findings.

**Results:** 16 public hospitals, each with more than 3,000 births annually, representing 15% of the annual births in public institutions, participated in the intervention. A pre-evaluation meeting was held at each hospital to present the project, the standards and methodology. The evaluation lasted 2-3 days. Afterwards, each institution received an executive summary and a presentation with photos of strengths and non-compliant processes, graphs, and

suggestions for next steps. A detailed spreadsheet prioritizing findings based on risk, and formatted so that action plans and progress could be registered, was also provided. The MOH received reports on tendencies in the findings. The 3 most problematic functions, determined by those high-risk weighted standards that had the most number of organizations scoring non-compliant, related to: 1) adult CPR and preparedness for emergency obstetric care 2) patient identification 3) and medication management.

**Conclusion:** Provincial ministers of health had recommended a hospital accreditation program with EE methodology to accelerate improvement efforts towards the MDGs 4 and 5. The EEs conducted in this study identified and prioritized safety risks and quality gaps in 16 Argentine public hospitals. Tendencies showed less than 80% compliance in multiple key functions in many of the participating hospitals. Review of the specific findings indicate that there are opportunities for improvement through strengthening support and oversight mechanisms. Logically, interventions targeted towards correcting the most frequently cited high-risk priorities have the potential to improve safety and quality. However, the effectiveness of EE, as part of an accreditation program, and as a tool for improving outcomes in Argentina, requires further study.

#### ISQUAI6-1337 MANUAL CLEANING OF ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY ENDOSCOPES USING REMOTE VIDEO AUDITING

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**Objectives:** The Society of Gastroenterology Nurses and Associates (SGNA) outlines practice standards for manual cleaning of endoscopic retrograde cholangiopancreatography endoscopes before being placed into an *automated endoscope reprocessors* (AER) between patients to prevent the transmission of pathogens [1]. Even though there are detailed guidelines for reprocessing endoscopes there have been multiple reports of patients acquiring Carbapenem-Resistant Enterobacteriaceae (CRE) following an endoscopic retrograde cholangiopancreatography (ERCP) [2]. Since pathogen transmission can be related to improper cleaning of the endoscope between patients this initiative was designed to assess adherence to the multi-step process for manual cleaning of ERCP endoscopes with the use of remote video auditing (RVA).

**Methods:** In October 2015 the leadership at a 252-bed community hospital committed to ensuring adherence to the ERCP endoscope manual cleaning steps as outlined by SGNA and the manufacturer. Cameras were placed within the endoscope reprocessing area with a live feed to a digital video recorder that was accessed by a third party auditing company, Arrowsight Inc. The recorded activity provided the auditors with a complete view of the

sinks utilized to manually clean the endoscopes prior to being placed into the AER. Trained auditors from Arrowsight, located external to the facility viewed streaming video of the activity in the reprocessing room. Once the auditors observed an ERCP endoscope entering the room and pre-cleaning was started by the health care worker (HCW), their compliance with each item on the checklist, as well as the total duration of cleaning was recorded. Video auditors assigned a Pass to each item on the checklist when the HCW completed each task and the amount of time spent to complete the entire checklist was recorded. Conversely auditors indicated a Fail when a HCW missed tasks on the checklist.

**Results:** The forty-one item manual cleaning checklist and compliance with the pre-cleaning can be viewed and scored with the use of RVA.

**Conclusion:** ERCP endoscope scope cleaning is a complicated process with multiple steps. The use of RVA provides a tool for gathering objective data on a process that can be analyzed and used to guide interventions. The same methodology can also be used to assess ongoing improvements and/or sustained activity. RVA has reported success with HCW compliance with hand hygiene and terminal cleaning of an operative room at the end of each day of use [3]. RVA and ERCP endoscope pre-cleaning has the potential for reproducing similar outcomes.

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#### ISQUAI6-1324

### STANDARD RISK SCREENING AND ASSESSMENT TOOLS USED TO PREVENT HARM TO OLDER PEOPLE IN HOSPITALS

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**Objectives:** Describe the use of standard risk screening and assessment tools used to prevent harm to older people in hospitals and identify good practice examples to guide ongoing quality improvement.

**Methods:** A descriptive cross-sectional audit of 11 health services guided by six draft standards for good practice. Data collection included the standard risk screening and assessment tools used to assess older people in hospital and focus group discussions with key stakeholders.

**Results:** 152 standard assessment tools from 11 health services were examined; 69 staff from 9 hospitals participated in focus

groups. The 152 forms had over 3,700 items; 2,428 were on standard forms used universally, for every patient; 1,283 were on forms used selectively.

Hospitals use multiple standard assessment forms (median 11, range 8-27) that collect up to 586 individual data items (median 345, range 150-586) from each patient. Approximately 17% of data are duplicated across multiple forms.

Assessments of skin integrity, mobility (incl. falls) and medical risks (e.g. vital signs, concurrent high risk medical conditions) were consistently included in forms used universally at all health services. Variability across health services related to assessment of nutrition, cognition (including delirium), pain, medication and discharge. Assessment of continence and medical risks such as venous thromboembolism (VTE) and hospital acquired infection (HAI) (e.g. related to invasive devices) and high risk patient characteristics (e.g. pre-existing cognitive impairment, self-care ability or substance abuse) were infrequent.

Thematic analyses of focus groups discussions revealed two major themes and a number of sub-themes describing the use of standard risk screening and assessment tools in hospitals. Most prominent was the “*burden on staff and the older person*”; subthemes related to “*workload burden*” and “*cognitive burden*” due to the high number of standard forms, time taken to complete the forms and the high volume of information collected. Three sub-themes related to the theme “*using standard forms to prevent harm during hospitalisation*” these were; “*interprofessional collaboration*” that recognised disciplines need to share and work collaboratively but tend to work in silos; “*flexibility to individualise care*”, highlights the challenges involved with ensuring the best mix of interventions are also aligned individual preferences, particularly for those with complex risk profiles; and “*information management*” revealed the challenges of maintaining accessible, accurate, reliable and contemporaneous information to monitor progress, detect change early and inform clinical decision making.

**Conclusion:** The multiple standard risk and assessment forms used in hospitals inconsistently capture some common preventable harms of hospitalisation and are burdensome for staff and patients. Recommendations include:

1. Explore use of ‘global triggers’ to reduce delays to interventions;
2. Reduce burdens on patient and staff;
3. Build resilience in frontline clinical governance to prevent harm.

#### ISQUAI6-2346

### A COLLABORATIVE CROSS-COUNTRY STUDY TO MEASURE THE IMPACT OF ELECTRONIC MEDICATION MANAGEMENT SYSTEMS

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**Objectives:** Internationally, countries are investing in electronic medication management (eMMS; also known as CPOE/ePrescribing) systems to improve medication safety. These organisational-wide interventions impact the work of all involved in the medication pathway and can significantly impact workflows. Hospital pharmacists' work is particularly likely to be affected, yet little research has attempted to quantify the nature of these changes, or their impact on medication service efficiency or safety. Cross-country research in health informatics is rare. As a result, many small-scale studies are replicated in different locations. Variations in methods and outcomes, means that comparison of results is often problematic.

Our objective was to devise a cross-country study to investigate the impact of eMMS on pharmacists' work in Australia and the UK. Both countries have a similar tradition of pharmacist training and practice. eMMS is expected to allow pharmacists to increase their engagement in clinical tasks and reduce their administrative burden. This paper describes this cross-country project and results from the first two UK and Australian sites.

**Methods:** We designed controlled work measurement studies of pharmacists, pre- and post-eMMS in four hospitals (2 in the UK and 2 in Australia). The studies use a direct observational design using the Work Observation Method by Activity Timing (WOMBAT) tool [1]. Trained observers shadowed pharmacists. The results we report relate to 263.8 hours of observation from two hospitals prior to eMMS implementation. The final sample pre and post eMMS will be 800 hours of observation.

A pharmacy work task classification was developed, through an iterative approach between the Australian and UK teams, comprising 11 broad categories of work. Each was defined by inclusion and exclusion criteria and pilot tested. The classification was incorporated into the WOMBAT software on a hand held computer. Observers recorded tasks, with whom, and where completed, and interruptions. Inter-rater reliability testing was applied.

**Table 1** Percentage of pharmacists' time on tasks, with others and interruptions at baseline at one major hospital in each country

	UK Hospital (n = 165.5 hours)	Australian Hospital (n = 98.3 hours)
Medication reviews	25.9	21.8
Non-clinical tasks	25.5	23.8
Work-related discussion	12.0	10.0
History taking	5.3	7.0
Supply medications	3.4	6.1
Time with patients	12.9	5.0
Time with doctors	5.6	6.1
Time with nurses	6.4	7.6
Tasks interrupted	7.5	7.6

**Results:** The work classification identified generic hospital pharmacist tasks which could be applied in the field. Baseline data from two UK and Australian hospitals indicate that there were many similarities in hospital pharmacists' patterns of work (Table 1). Both groups spent nearly one-quarter of their time in non-clinical tasks (e.g. in transit, waiting, looking for something) and a low proportion of time with patients, both areas that eMMS is expected to impact. Post-eMMS data collection in the UK will be completed by April and in Australia in August 2016 allowing changes in work patterns post eMMS to be assessed.

**Conclusion:** This multi-site, cross-country study, with standardised methods should permit robust analyses to answer important questions about the impact of information technology on health professionals' work and medication safety.

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#### ISQUAI6-1327

#### ESTIMATING THE EFFECTS OF FALL PREVENTION INTERVENTIONS BY ADJUSTING FOR THE RISK OF FALLING WITH A PROPENSITY SCORE

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**Objectives:** The hospital fall prevention programs that reduced fall rate included fall-risk assessments, multifactorial interventions, post fall follow-up, and integration with electronic records (Spelstra, 2012). However, patients who have received multifactorial interventions and patients who have not have different levels of fall-risk. This hampers comparison of patients who have received interventions and patients who have not and it precludes a determination of the effectiveness of individual interventions. The aim of this study was to examine the effects of fall prevention interventions by adjusting for the fall-risk with a propensity score.

**Methods:** This study was conducted at an acute-care hospital with 716 beds. Electronic medical records at this hospital were linked to the Fall Risk Assessments Tool (Morita, 2010) and a standard plan to prevent falls (Oki, 2012). Subjects were admitted to wards or units other than Pediatrics, the NICU, and the ICU from April 2009 to March 2013. The Falls Risk Assessments Tool has a sensitivity of 74.5%, and specificity of 79.6%, and an area under the ROC curve of 0.822. Patients were assessed for 19 risk factors for falls. Standard interventions to prevent falls were listed along with 49 specific interventions to prevent falls on a

screen displaying the patient's medical records. These interventions were based on meta-analyses, guidelines, and a root cause analysis at the hospital conducted by interdisciplinary team. Logistic regression models for risk of fall was applied to gain odds ratio (OR) and 95% confidence interval (CI) for 49 specific interventions to prevent fall, separately. To adjust background difference among those with and without a given intervention, a propensity score was entered to the model. This score was calculated individually using logistic regression model for each intervention and intervention-specific patients' background. Analysis was performed using the Stata ver. 13.

**Results:** Subjects had a mean age of 66.5 years (SD: 17.4). Of the 61,949 total patients, 1,071 (1.72%) had fallen after their current admission. The odds ratio for 19 risk of falling were higher in "had previously fallen after admission" (OR 8.5, CI 7.0 to 10.4), "impaired balance" (OR 3.7, CI 3.3 to 4.2), "being restless"(OR 3.6, CI 2.9 to 4.4).The intervention that was most effective at preventing falls was to provide patients taking a narcotic, an antidepressant, a sleep aid, or an antihypertensive diuretic with "toileting assistance after taking a laxative or a diuretic (OR 0.43, CI 0.3 to 0.7 p<0.00)." This intervention was implemented for 1,198 of 13,582 patients, and its rate of implementation was low at 8.8%. Other interventions were "informing a physician of the efficacy of a patient's medication and adjusting that medication" (OR 0.56, rate of implementation 8.1%), "informing family members of the condition of agitated patients and asking that they accompany those patients" (OR 0.57, rate of implementation 35.8%), and "paying closer attention to patients who have transferred departments, wards, or units while performing nightly rounds" (OR 0.57, rate of implementation 38.6%).

**Conclusion:** The results showed that three interventions to prevent falls in accordance with the patients' risks improved the fall ratio by 0.43 - 0.56 times. But results also revealed that such interventions are implemented at a low rate. Thus, interventions to prevent falls should be implemented at a higher rate.

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### ISQUAI6-2073

#### IMPLEMENTING EXTERNAL ELECTRONIC MEDICATION RECORDS TO PROMOTE EFFECTIVE HOSPITAL MEDICATION RECONCILIATION

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**Objectives:** Lack of accurate information among health professionals and patients about pre-admission medications can lead

physicians inadvertently adding or duplicating medications, resulting in unintended harms and costs. PharmaCloud is an electronic based system, consisted of prescription claims covered by the universal National Health Insurance program for all insured in Taiwan. This study is to report the process and outcome related to the implementation of national electronic medication records (EMR) in a medical center aims to support effective medication reconciliations.

**Methods:** A cross-sectional study was conducted at a tertiary medical center in Taiwan, using quantitative and qualitative data between Jan 2015 and Feb 2016. Uptake level of PharmaCloud was assessed in ambulatory and inpatient care settings on: favorable impacts on medication reconciliation among hospitalized patients; integration with computerized clinical decision support system (CDSS) in regular workflow; factor associated with the integration of external EMR into internal health information system (HIS). Descriptive analysis for the frequency and patterns of PharmaCloud use in routine prescription order entry system was performed. Qualitative survey data were collected from meetings and events involving physicians, nurses, information technology and medical affairs staff and hospital administrators, and pharmacists who are involved in a strategic plan for improving medication reconciliation.

**Results:** The implementation process involved 5 steps: establishment of the implementation committee, collection of paper-based patient consent form for data sharing, standards of EMR retrieval and security, integration of external EMR with internal HIS, and designated priorities for medication reconciliation in CDSS across the study setting. Over 1-year period, PharmaCloud was fully accessible through internal HIS to provide patient's pre-admission prescription information in the entire study setting. Rate of use was over 85% patient-visits in the ambulatory setting. In hospital setting, snapshot results showed that 50 units with 302 physicians for caring 629 patients accessed to PharmaCloud more than one time between 2/2/2016 and 2/22/2016. Of 6,159 prescription orders documented through CDSS, 11.2% prescriptions were saved by using patient own drugs, and 3,092 potential duplicated orders (with 16.9% high-alert medications) were avoided by alerts. Perceived factors associated with the timing of diffusion in the process were national regulations and standards to integrate EMR between internal and external sources, motivation and effective in-house policy to adopt. Data quality, user friendly tools and effective computer problem-solving were essential elements associated with the degree of clinicians' engagement and adoption to accrue the benefits of implementation.

**Conclusion:** The study results suggested that PharmaCloud represents a good tool to support effective medication reconciliation at hospital level in the health care system. Despite of the established national EMR infrastructure, more impactful attempts at implementing action to promote greater use of external EMR in patient safety improvement might be determined by a number of deliberate features, including updated regulations, support from organizational and environment facilitators, views and values about the nature of implementation.

**ISQUAI6-2356****A NATIONAL SCHEME TO ENSURE MEDICATION SAFETY: THE NATIONAL CERTIFICATION SYSTEM FOR COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE) IN FRANCE**

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**Objectives:** The French National Authority for Health (HAS), an independent public scientific authority, is required to define a national mandatory certification system for CPOE. Certification requirements focus on health specifications with potential impacts on patient safety, quality of care and efficiency, drug prescription safety, drug cost, and simplifying users' work.

**Methods:** Two certification schemes were defined by the HAS in 2008 and 2012 by consensus among user representatives, public stakeholders and representatives of software companies:

- one for hospital CPOE systems based on hospital drug formulary (« Hospital CPOE » published in 2012)
- one for CPOE systems used in ambulatory care settings where medication orders are not restricted by a drug formulary (« Ambulatory CPOE » published in 2008)

These certification processes must be conducted by an accredited certification body under ISO/CEI 17065 norm.

These certification schemes were paired with an approval process for Pharmaceutical Data Bases (PDB) also defined at national level by the HAS: only CPOE incorporating approved PDB are allowed to apply for certification. This prerequisite aims at ensuring the ability of CPOE systems to provide comprehensive, referenced, neutral, updated and complete drug information.

**Results:** In France, five PDB are now approved by the HAS.

In February 2016, 60 softwares representing 75% of CPOE used in primary care are certified « Ambulatory CPOE » under the scheme published in 2008. The most frequently used hospital CPOE in France are certified « Hospital CPOE » under the scheme published in 2012. The extent of implementation of certification of hospital CPOE has not been assessed as of this date. Dissemination is expected to reach a similar level as in primary care.

Certified CPOE:

- are not allowed to show advertisement;
- provide security checks for drug use with medical record data including maximum dosage, drug interactions, pregnancy, lactation, medical history and allergy;
- allow users to prescribe using International Nonproprietary Names without the pharmaceutical brand name for a wide range of drugs with the same security checks;
- provide price of drug, reimbursement rates by the national health insurance, and costing of drug prescriptions;

- provide updated, neutral and comprehensive drug information including information from the Health Technology Assessment process.

**Conclusion:** The HAS is stepping up on these actions. In December 2015 HAS published a mandatory certification scheme for community pharmacy-dispensing software. HAS has also recently been required to define a mandatory certification scheme for hospital pharmacy-dispensing software. Further versions of all these schemes of certification will extend their functional scope to therapeutic choices and interoperability.

**ISQUAI6-2082****INTERGRATION OF QUALITY CONTROL CIRCLE AND PHS WIN-WIN CONCEPT TO PROMOTE THE MEDICAL QUALITY OF HEMATOPOIETIC MALIGNANCIES**

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**Objectives:** Infection and bleeding contribute to about 2/3 and 1/3 of mortality associated with hematopoietic malignancies in Nanfang Hospital, China. To promote the medical quality, two rounds of Quality Control Circle (QCC) were carried out, with the aim to solve the above mentioned complications.

**Methods**

1. The perianal infection is the most common infection for hematopoietic malignancies (up to 60%>100%, Ann Hematol. 2003; 82:S167). With severe immunodeficiency (agranulocytosis $\geq$ 2w), the perianal infection rate was 17.2% in the bone marrow transplantation center (from Apr to Sep, 2013). Then QCC1 was carried out following the 10 steps of Plan-Do-Check-Action. Bacterial colony culture experiments from perianal skin before and after sanitization were performed. Since warm aqueous solution of potassium permanganate are recommended for sanitization, such bacterial colony culture is also used to find a proper drug concentration, water temperature and soaking time etc. Eventually a tool kit was developed (CN patent No.201520820954.7) to ensure the standardization of procedures. Patients, hospital staff and medical students were involved in this QCC.
2. With the team of QCC1, we started QCC2 for decreasing mortality due to bleeding, the shortfall being the insufficient supply of platelets. Tackling of this condition is more complicated and demanding, which also exists in many developing countries of Asia. We integrated the functioning of PHS, which stands for patients (P); hospital staff (H); students and society (S); in accordance with the complementary advantages (Table 1) for co-operation. Four strategies were incorporated as: Establishing a team, setting up a platelet donor bank, systematic education and establishing a new platelet harvest station.

## Results

1. The perianal infection rate gradually decreased from 17.2% to 5.25% and subsequently declined in the following year. Apparently each case of perianal infection could detrimentally prolong hospitalization by  $\geq 2$ w and approximately 28,000 Yuan of expenditure for treatment, as well as witnessing >4,000/year such hospitalized cases in Nanfang Hospital and from amongst 40,000 new findings of leukemia in China, this QCC1 was awarded the first Prize of Chinese QCC in 2014.
2. Comparing 9 months before QCC2 (2014Feb.-Oct.) and 9 months later (2014Nov.-2015July), we found that the number of platelet transfusions in the department of Hematology increased from 2,815 U to 3,674 U (130.5%) and the success rate of applications increased from 58.67% to 75.77%. QCC2 also helps to establish a professional team named as Blood and Bone marrow China (BBCn), which have conducted 19 lectures on platelet donation; as well as set up a proficient platelet donors Bank, enrolling 375 Chinese and 73 international volunteers, donating 135U of platelet. Interestingly, a new platelet harvest station is under construction in Nanfang Hospital, which will harvest thousands of new blood platelets each year. Mortality due to bleeding will significantly decrease thereafter.

**Table 1** Analysis of patient, hospital staff, student and society (PHS)

	Presence of	Absence of
Patient	Diseases Social relationships Option to select a hospital	Knowledge Psychological comfort Blood/Platelet Money
Hospital staff	Knowledge Experience	Time Enthusiasm
Student & Society	Time Money Enthusiasm Blood/Platelet, etc.	Information Training Trust

**Conclusion:** QCC and PHS win-win concept could promote the medical quality of hematopoietic malignancies. Most beneficially, they will also alleviate the social conflicts between doctors and patients tremendously.

## ISQUAI6-2831 EFFECTIVENESS OF INFECTION CONTROL FOR PREVENTING CATHETER-ASSOCIATED BLOODSTREAM INFECTION

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**Objectives:** Catheter-associated bloodstream infections (CABSI) are related to neonatal mortality and morbidity.

Incidence of CABSI among neonates in Hung Vuong Hospital was high.

**Aim:** An intervention study was conducted to evaluate effectiveness of the intervention for CABSI and to identify risk factor associated with CABSI.

**Methods:** All nurses caring for neonates in study setting were trained prevention of catheter related to bloodstream infection and aseptic techniques. They were required to pre- and post-test of the training module. Supportive supervision was conducted on a daily basis to strengthen compliance with aseptic techniques of the nurses during 6-month intervention (01/09/2011 to 29/02/2012) and preparation for total parenteral nutrition was relocated. All neonates with more than 48 hours intravenous catheter insertion hospitalized during six months in the pre- and post-intervention periods were enrolled. A standard case definition for CABSI was applied. We used Poisson regression to calculate rate ratio (RR) for CABSI incidence rates before with after intervention and logistic regression to identify risk factors associated with the CABSI.

**Results:** Of 2,551 neonates enrolled in the study, 1,273 enrolled in the pre-intervention, of which 58 CABSI occurred in 9,129 catheter-days, and 1,278 in the post-intervention, of which 32 CABSI occurred in 7,316 catheter-days. There were significant differences for mean treatment course and mortality rate between those recruited before and after the intervention ( $p < 0.005$  and  $< 0.001$ , respectively). Incidence rates of CABSI before and after the intervention significantly decreased from 6.35 to 4.37/1000 catheter-days ( $p < 0.001$ ). Catheter-maintaining duration and blood infusion associated with CABSI ( $p < 0.05$ ).

**Conclusion:** The intervention was significantly decreased in incidence rate of CABSI. Periodically knowledge provision and supportive supervision are critical for nurses in compliance with guidelines to reduce CABSI.

## ISQUAI6-1513 WHAT ARE JUNIOR MEDICAL DOCTORS IN ETHIOPIA ACTUALLY DOING: USING EVIDENCE GENERATED FROM TASK ANALYSIS STUDY TO STRENGTHEN MEDICAL PRACTICE, EDUCATION AND REGULATION

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**Objectives:** Doctors play critical roles in improving health services quality and realizing the roles requires improving quality of medical education and practice. We conducted a task analysis study to describe practice of junior medical doctors in Ethiopia and generate evidences for strengthening their education, practice and regulation.

**Methods:** A cross-sectional study was conducted in February 2015 with nationally representative sample of recently graduated medical doctors (6 months to 4 years of experience) working in public hospitals. We used structured interview to determine how

often they performed expected tasks, how competent they felt in completing them and the perceived importance of the tasks for patient and/or population health outcomes. We calculated percentages and averages to describe practice characteristics. Tasks with a combination of relatively low competence, low frequency and high criticality scores were identified as indicative of priority gaps in education and practice. We determined emphasis and distribution of medical licensing exam by combining means of frequency and criticality scores and averaging it with expert rating.

**Results:** A total of 191 general practitioners sampled from 66 public hospitals in the nine regional states and two city administrations participated in the study. Majority of them were males (73.8%) and had 2 years or less of work experience (66%). Almost all respondents (98.5%) recognized the importance of the medical tasks for patient and population health outcomes. Majority of respondents (51.6–58.5%) said they provided medical, pediatric, and dermatology care frequently. In contrast, majority of (55.6–77.2%) reported infrequent performance of tasks related to psychiatry, ophthalmology, dentistry, obstetrics/gynecology, and population health and health systems. Further, vast majority of doctors (74.7–99.2%) said they were competent in all domains of clinical care. However, a significant percentage (9.3–25.3%) reported capacity gaps in dental, ophthalmic, obstetrics/gynecology, surgical, generic clinical skills, emergency, psychiatry and population health and health systems functions. Gaps in education seem to be highest for long-term and permanent family planning methods, clinical and laboratory diagnostic procedures, surgical and obstetrics/gynecology therapeutic procedures, management of eye problems, population health and health systems, and, research competencies. Furthermore, our results suggested that the exam distribution for licensing exam should be 20.8% internal medicine, 15.9% surgery, 17.3% pediatrics, 15.6% obstetrics and gynecology, 3.8% psychiatry, 4.2% dermatology, 3.7% ophthalmology, 3.6% ear, nose and throat, 3% dentistry and oral health and 12.3% public health.

**Conclusion:** Although general practitioners recognize importance of their duties and responsibilities, their actual practice is not sufficiently comprehensive with limited participation in mental, eye, dental and reproductive health care and public health activities. Top pre-service education gaps and priority needs for in-service training were found to be long-term and permanent family planning methods, procedural skills, eye care, and population health and health systems. The first medical licensing exam blueprint was developed based on results of the task analysis

## ISQUA16-2548

### WHAT WOULD IT TAKE FOR ACCREDITATION TO BE COST-EFFECTIVE? A THRESHOLD ANALYSIS CASE STUDY

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**Objectives:** Accreditation is designed to improve patient safety and quality of care through assessing whether hospitals have appropriate clinical governance systems and training programs in place. Despite widespread adoption, there is little evidence that accreditation programs are cost effective in achieving their stated aims. Hospital infection control standards are common across accreditation programs and hospital acquired infection rates are routinely promoted as a quality indicator of acute care. We hypothesised that hospitals with higher accreditation scores would have reduced infection rates through a co-ordinated governance approach to infection control. Our aim was to assess the change in hospital acquired infection rates needed to meet the costs of accreditation in Australian public hospitals.

**Methods:** We used threshold analysis to estimate the minimum impact of the infection control standard in order for it to be considered cost-effective. We used published incremental costs of accreditation in Australian hospitals, and analysed hospital acquired *Staphylococcus aureus* bacteraemia (SAB) rates as an outcome indicator accreditation. We calculated the benefits of reducing SAB rates through reduced length of stay, [1] and Quality Adjusted Life Year (QALY) measures from the literature to capture the value a life lost from a SAB infection and patient inconvenience from non-fatal infections.

**Results:** The evidence that accreditation is associated with infection rates is mixed. One study showed that smaller hospitals with higher accreditation scores had lower infection rates, but this effect was reversed in larger hospitals [2]. Our analysis illustrates the magnitude of SAB rate changes that are needed to match accreditation costs. The incremental costs of accreditation for public hospitals have been reported at 0.097% of annual recurring revenue, equivalent to AUD42.68 million in 2013–14 (1AUD = 0.72USD). This equates to AUD3.05 million per standard when apportioned across the 14 standards in the accreditation surveys conducted by the Australian Council on Health Care Standards during 2012–13.

Accreditation benefits can be described by the number of infections averted. Based on an extended length of stay of 12.1 days and an average bed day cost of AUD2,337.5 in 2013–14, the extra cost per SAB infection is AUD28,283.00. The accreditation costs per standard are equivalent to reducing SAB rates by 107.8, or 6.7% of all SAB infections in 2013–14. Using a conservative estimate of AUD46,100.00 per QALY gained, the patient impact of 0.007 QALYs per non-fatal infection, reduces this figure to 6.6% of non-fatal infections, or 0.11 fatal infections per year. Accreditation standards cover a wide range of hospital activities. We estimate a bed day reduction of bed days by 0.097% would meet total accreditation costs, although a sensitivity analysis would be required to complement this analysis.

**Conclusion:** The lack of clear outcomes and causal relationship between accreditation and patient safety and quality outcomes creates a challenge in determining whether accreditation is cost effective. However only a small reduction in bed days would be required for a positive return on the investment made in an accreditation program. The approach illustrated in this study demonstrates the complex nature of the analysis required to assess accreditation costs and benefits.



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## ISQUIA16-2703

### THE ASSOCIATION BETWEEN WEEKEND/ WEEKDAY IN-HOSPITAL MORTALITY AND CENTRALISATION OF STROKE SERVICES

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**Objectives:** In 2010, stroke services were centralised across two large metropolitan areas in England to increase the quality of stroke care. In London, there were 30 hospitals admitting acute stroke patients and from July 2010, stroke services were centralised into eight hyperacute units which would provide care over the first 72 hours. Previous research indicated that this change was associated with a reduction in mortality, length of stay and cost [1, 2]. Previous studies have also suggested that stroke patients admitted on weekends have worse outcomes [3]. We examined whether differences in weekend/weekday mortality changed in association with the reconfiguration of services.

**Methods:** We examined stroke admissions using hospital administrative data collected between January 2008 and December 2014 in England (excluding Greater Manchester). A descriptive analysis of patients was carried out by weekend/weekday admissions and pre- and post-centralisation. The main outcome was 7 day in-hospital death.

**Results:** During the study period, 478,872 stroke admissions were identified of which 25.7% occurred during the weekend. Patients in Greater London were slightly younger, more likely to be male and less likely to be white than in the rest of England. The proportion of intracerebral haemorrhage stroke was slightly higher in London. Seven day in-hospital mortality was 8.7% in London and 10.5% in the rest of England. After the centralisation of stroke services, an 11% (RR = 1.11, 95% CI 1.00–1.24) higher weekend to weekday deaths ratio declined to 8% (RR = 1.08, 95% CI 0.99–1.17) representing a 27% reduction in relative risk. For the rest of England, a 16% (RR = 1.16, 95% CI 1.12–1.19) higher weekend to weekday ratio decline to 14% (RR = 1.14, 95% CI 1.10–1.17), representing a 13% reduction in the relative risk.

**Conclusion:** During the study period, the relative risk between weekend/weekday 7 days in-hospital mortality appeared to fall in Greater London and fell more slowly in the rest of England, suggesting that reorganisation of services can reduce the weekend effect whilst also reducing cost. Further analysis is needed to investigate the significance and explanation for this change in mortality.

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## ISQUIA16-1960

### HEALTHCARE SERVICES UTILIZATION FOLLOWING ADMISSION FOR HIP FRACTURE IN PATIENTS OLDER THAN 65 YEARS

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**Objectives:** The purpose of this study was to assess the effect of hip fracture on healthcare utilization during the first year following the event.

**Methods:** Enrollees of Clalit Health Services, the largest healthcare provider organization in Israel, admitted with a hip fracture to any of 8 Clalit-owned hospitals during 2009–2013, were included in the study. Data collected included demographics, comorbidities, admission details related to the surgical and rehabilitation hospitalizations, mortality and costs. Mean monthly costs before and after the event were compared using paired sample T-test. Quantile regression was used to analyze associations between patient characteristics and healthcare expenditure in univariate and multivariate analysis.

**Results:** Of 9,650 patients admitted with hip fracture during the study period, 6,880 (71%) were Clalit enrollees and included in the present study (69% female, median age: 83 years). Total mean monthly costs increased by 96% during the follow-up year (\$1,470 versus \$749), compared with baseline expenditure. Costs for rehabilitation accounted for 40% of costs during the first follow-up year. Mean monthly non-rehabilitation costs increased by 21% (\$877 versus \$722). Several factors were found to be consistently associated with increased mean monthly costs during the follow-up year. These included Charlson's Comorbidity Index, Cushing's syndrome, hypertension, baseline expenditure in the base year, discharge to a rehabilitation facility and mortality during the follow-up year.

**Conclusion:** Hip fractures in adults in Israel are associated with a significant increase in healthcare utilization and costs. This largest

increment was seen in costs for rehabilitation. However, increased costs were noted in all sub-categories of healthcare costs.

### ISQUA16-1366 HIP FRACTURE MORTALITY BY TEACHING STATUS OF TREATING HOSPITAL

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COLLABORATIVE STUDY ON HIP FRACTURES<sup>3</sup>

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**Objectives:** There is inconsistent evidence for an association between treatment setting and hospital mortality after hip fracture. This study compares the risk of hospital death between patients treated in teaching and community hospitals, controlling for potential confounders and length of stay.

**Methods:** Analysis of 167,816 hip fracture patients aged 65 years and older entered into Canadian acute hospital discharge abstracts from 2004-2012. Cumulative incidence of hospital death by in-patient day, accounting for discharge as a competing event for teaching and community hospitals.

**Results:** The cumulative incidence of hospital death at in-patient day 30 was lowest for teaching hospital admissions (7.3%) and highest for small community hospital admissions (11.5%). The adjusted odds of hospital death were 12% (95% CI 1.06–1.19), 25% (95% CI 1.17–1.34), and 64% (95% CI 1.50–1.79) higher for large, medium, and small community versus teaching hospital admissions. The adjusted odds of nonoperative death were 1.6 (95% CI 1.42–1.86), and 3.4 times (95% CI 2.96–3.94) higher for medium and small community versus teaching hospital admissions. The adjusted odds of postoperative death were 14% (95% CI 1.07–1.22) and 20% (95% CI 1.10–1.31) higher at large and medium community versus teaching hospitals. The adjusted odds of postoperative death were largest at small community hospitals (OR = 1.25, 95% CI 0.92–1.70).

**Conclusion:** A higher proportion of hip fracture patients die at non-teaching compared to teaching hospitals accounting for length of stay. Higher mortality at small community hospitals may reflect disparities in access to resources and delay to treatment.

### ISQUA16-1655 THE EFFECT OF DEMENTIA ON MEDICAL CARE IN MIDDLE-AGED AND ELDERLY PATIENTS WITH DIABETES MELLITUS IN TAIWAN

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**Objectives:** Patients with diabetes may have a higher risk of developing dementia. When combined with diabetes, the occurrence of dementia can worsen health care outcomes and increase medical

resource consumption for patients. It can also lead to heavy burdens on the health care system. However, related studies are still limited in Taiwan. The main objective of this study is to investigate the influence of dementia on medical care situations for middle-aged and elderly patients with diabetes.

**Methods:** A retrospective secondary data analysis approach was used to analyze the National Health Insurance Database from 2010 to 2012. All study samples were divided into a case group and a control group based on whether they were diabetics suffering from dementia or not. A Propensity Score Matching method (PSM) was used to control variables in order to reduce the effects of interference between the study groups. Applying the t-test, chi-square test and regression analysis method, medical resource consumption and medical care outcomes were explored between the case group and control group.

**Results:** 768 and 3,840 patients were included in the case group with dementia and control group without dementia respectively. Study results showed that diabetic patients suffering from dementia have a significantly higher health care utilization ( $p < 0.05$ ). Using multivariate logistic regression analysis, results also showed that diabetes patients with dementia have an increased risk of hospitalization (OR, 1.64; 95%CI, 1.37–1.95), emergency room use (OR, 2.15; 95%CI, 1.81–2.56) and mortality rate (OR, 1.22; 95%CI, 1.00–1.48).

**Conclusion:** Results from this study showed that diabetic patients suffering from dementia have a poorer quality of health care with higher resource consumption. These additional costs create heavier burdens to the health care system. Further research and more attention regarding comprehensive care for diabetic patients with dementia are needed in order to improve the quality of patient care.

### ISQUA16-2853 ANALYSIS OF PATIENT SAFETY INCIDENTS IN BRAZILIAN ACCREDITED HOSPITALS - THE SAFETY SENTINEL PROJECT

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**Objectives:** The objective of this study was to identify critical points concerning patient safety through the analysis of a database with compiled incident notifications from 107 health organizations in Brazil.

**Methods:** Since 2002 IQG - Health Services Accreditation (IQG) follows the voluntary reporting of patient safety incidents, carried out by Brazilian accredited institutions. In 2014 the Brazilian Patient Safety Program (PBSP) team began to conduct this process, improving the communication channels, aiming to strengthen the safety and learning net, prioritize critical points concerning patient safety, identify intervention strategies, and promote best practices in incident analysis.

Healthcare organizations voluntarily report the safety incidents detected and the plan designed to reduce risks and prevent recurrence. The incidents are classified by incident type and patient outcomes and the analysis focus on identifying contributing factors and hazards. The PBSP technical team evaluates the incident analysis reported by the organization, and gives a feedback by phone or e-mail on the assertiveness and maturity of the analysis and effectiveness of the proposed plan of action. The technical team also publishes quarterly reports on the incident analysis database, and holds web based conferences for the discussion of the most frequently identified contributing factors and hazards.

**Results:** From 2012 to 2015 the Brazilian Patient Safety Program received 13,316 patient safety incident notifications, from 107 healthcare organizations across all regions of Brazil, including acute care hospitals, ambulatories, oncology centres, hematology and blood bank centres, clinical laboratories and imaging diagnostic centres.

We noticed a significant increase in the number of reported incidents in the period of 2012 to 2015. Observing the reported incidents classified by patient outcome, the increase is both evident among harmful incidents and no harm incidents as can be seen on the table below. The number of near misses reported is not significant yet.

Year	Incidents Reported	Harmful Incident	No Harm Incident	Harmful Incident resulting in Death
2012	317	317	0	91
2013	340	339	1	87
2014	2777	2579	198	174
2015	9882	8412	1470	176

When analysing the group of Harmful Incidents that resulted in death, 40% happened in hospitals wards, 23% in emergency departments, 15% In intensive care units, 7% in operating rooms, 5% in imaging diagnostic units. In 39% of these harmful incidents that resulted in death, the delay in the detection of clinical deterioration (including delay in sepsis diagnosing) and initiation of clinical response were identified as major contributing factors.

**Conclusion:** The increase in the number of patient safety incidents reported show that the contact with the technical staff for support and guidance and the communication channels used (via phone, email and web conferences) were able to cross the continental distances inside Brazil and raise awareness and perception for patient safety. It also suggests that the feedback was positive for the organizations.

The necessity to review health professionals work dynamics, especially in hospital wards, regarding assessment of acute illness, detection of clinical deterioration and initiation of a timely and competent clinical response is supported by the analysis of the units where severe incidents occurred and the contributing factors identified.

## ISQUA16-1476

### RESILIENCE AND DEPRESSION SYNERGICALLY AFFECT SELF-CARE MAINTENANCE OF HEART FAILURE

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**Objectives:** Due to an aging population and improved survival from acute cardiac events, the prevalence of heart failure (HF) is rising worldwide. HF places a tremendous burden on patients, their families, the community, and the health care system. Inadequate self-care is common in HF, which often leads to acute exacerbations and hospitalizations. Guidelines on HF stress the importance of self-care behaviors, such as adhering to medications, following a low-sodium diet, exercising, and monitoring symptoms in the treatment of HF. The positive effect of resilience and negative effect of depression on self-care behaviors are well understood. Little is known, however, on possible synergic effects of depression and resilience on self-care confidence and self-care maintenance in this population.

**Methods:** A total of 203 patients with HF were enrolled. Information regarding demographic data, body mass index (BMI), comorbidities, exercise habits, depressive symptoms, psychological resilience, self-care confidence, and self-care maintenance were obtained. The burden of comorbidities was estimated by calculating the Charlson Comorbidity Index (CCI). Depressive symptoms were measured using the Beck Depression Inventory II (BDI-II). The Resilience Scale (RS) was used to determine the degree of psychological resilience. The Self Care of Heart Failure Index (SCHFI) was used to gauge the participants' levels of self-care confidence and self-care maintenance. Hierarchical multiple regressions models were developed to estimate the predictor role played by resilience and depression and the moderating effect of resilience on the relationship between depression and self-care confidence/maintenance.

**Results:** Hierarchical multiple regression revealed that both RS ( $B = 0.33$ ,  $SE = 0.06$ ,  $p < 0.001$ ) and BDI-II scores ( $B = -0.75$ ,  $SE = 0.23$ ,  $p < 0.001$ ) independently predicted the level of self-care confidence after adjustment of demographic variables, CCI, and BMI. In terms of self-care maintenance, RS scores ( $B = 0.15$ ,  $SE = 0.05$ ,  $p < 0.001$ ) but not BDI-II scores ( $B = -0.29$ ,  $SE = 0.17$ ,  $p = 0.10$ ) were found to be an independent predictor after adjustment of demographic variables, CCI, and BMI. Moreover, resilience and depression exerted a synergic effect on self-care maintenance as the resilience x depression interaction effect on self-care maintenance was statistically significant ( $B = 0.02$ ,  $SE = 0.01$ ,  $p < 0.001$ ).

**Conclusion:** Resilience enhances both self-care confidence and self-care maintenance in patients with HF whereas depression negatively affects self-care confidence. Resilience and depression act synergically on self-care maintenance. Thus, treatments targeting the enhancement of psychological resilience might mitigate the negative effects of depression on self-care maintenance of HF to optimize the outcomes of self-management strategies.

## ISQUAI6-1195 EVALUATION OF TEAM TRAINING IMPACT ON SURGICAL OUTCOMES: A CLUSTER RANDOMIZED TRIAL

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**Objectives:** The application of safety principles from the aviation industry to the operating room has offered hope in reducing surgical complications. We aimed to assess the impact on major surgical complications of adding an aviation-based crew resource management training program after checklist implementation.

**Methods:** We prospectively conducted a parallel group cluster trial between September 2011 and March 2013. Operating-room staff (surgeons, anaesthetists, nurses and quality managers) from 31 hospitals were randomly assigned to participate in a team training program. Team training program consisted in two half-day sessions administered by a duo of trainers from the aviation industry and the field of healthcare quality, focusing on major concepts of crew resource management (situational awareness, team synergy and interpersonal communication) and checklist utilization. The primary outcome measure was the occurrence of any major adverse event, including death, during hospitalization within the first 30 days after surgery. Secondary outcome measure was the compliance with checklist utilization in the medical record. Using a difference-in-difference approach, we estimated the ratio of the odds-ratios (ROR) to compare changes in surgical outcomes between intervention and control hospitals.

**Results:** We enrolled 22,779 patients, including 5,934 before and 16,845 after team training implementation. The risk of major adverse events fell from 8.8% to 5.5% in 16 intervention hospitals (adjusted OR, 0.57; 95% confidence interval [CI], 0.48 to 0.68;  $P < 0.001$ ) and from 7.9% to 5.4% in 15 control hospitals (0.64; 95% CI, 0.50 to 0.81;  $P < 0.001$ ), resulting in the absence of difference between arms (ROR, 0.90; 95% CI, 0.67 to 1.21;  $P = 0.47$ ). Outcome trends revealed significant improvements among ten institutions, equally distributed across intervention and control hospitals.

**Conclusion:** Surgical outcomes improved substantially with no difference between the team training and control arms. Successful implementation of an aviation-based team training program in this environment appears to require modification and adaptation of its principles to the context of the surgical milieu.

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## ISQUAI6-2258 IMPLICATIONS FROM CASE STUDIES AND UPDATING PROGRAMS IN THE TEAMSTEPS TRAININGS IN JAPAN

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**Objectives:** Our objective was to clarify implications from case studies to inform future activities in the TeamSTEPS Trainings in Japan. Enthusiasm for TS among interprofessional teams of healthcare workers reflects the program's status as one of the best solutions for problems of interprofessional collaboration and conflict, and improvement of patient safety. The most important outcome is that TS master trainers and instructors continue to study worldwide and to train participants happily and devotedly.

TeamSTEPS Japan Alliance(TSJA) was established in 2007. The quality of healthcare in Japan is among the world's highest, and patients receive the benefit of best practices in medicine at reasonable cost. But this quality of healthcare has been sustained by the extreme devotion and overwork of healthcare workers, necessitating effective training for interprofessional collaboration and patient safety to accommodate a rapidly aging workforce and an increasing demand for healthcare workers.

**Methods:** Reviewing case studies published by TSJA members from 2007–2015.

### Results

1. TSJA's work reflected Kotter's change theory (2012). TS programs include 8 steps recommended for change by Kotter. Sample cases of clarifying visions and strategies of change include: (1) strategies for expanding isolation units at a public cancer center; (2) strategies for human relationships and overwork in a medical supply department at a university hospital; (3) building a new interprofessional team in respiratory rehabilitation at a public community hospital; and (4) strategies for human relationships and patient satisfaction in a medical unit at a community hospital. The example of appreciation the outcomes step by step and continuing to promote were performed by many TSJA members.

As an example Case (4), a safety manager, TSJA member, intervened in a medical unit, which had many complaints from patients and concerns from other departments within the hospital. The safety manager and the unit manager who have been educated medical mediation skills clarified the problems. Unit manager listened to patients, families and staff very carefully, analyzed the conflicts for the complaints, and had many meetings with patients and staff. In a month, the attitude and behavior of staff changed and complaints decreased, and

the collaborative culture have been maintained now. Core competencies of TS were applied, Situation Monitoring, Leadership, Mutual Support, and Communication; medical mediation skills were included as well.

2. Consulting, information exchange and updating programs: Since 2007, TSJA has been educating master trainers and instructors. Instructors are increasing to 50, physicians, nurses, pharmacists, technicians, have reported their TS training works and undergone peer review. Materials have been updated, with support from the Agency for Healthcare Research and Quality, the US Department of Health & Human Services, provided free to healthcare workers through TSJA. Present booklets were renewed in 2015, and movies and documents can be accessed by registered users on the website. Newer information is shared with TSJA members only, but there are plans to open access to all healthcare workers soon.

#### Conclusion

1. TS training effectively applies change theory. Change theory offers strategies that require support from managers and other members of the organization to be enacted.
2. TS training needs support from outside of each hospital. Networking of TSJA members has succeeded in building and sustaining the nationwide TS training system.

#### ISQUAI6-2772

##### FORETHOUGHT ON THE END OF LIFE: USING SIMULATION TO IMPROVE COMMUNICATION SKILLS WITH END-OF-LIFE PATIENTS AND THEIR FAMILIES IN HOSPITALS OF CLALIT HEALTH SERVICES

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**Objectives:** Healthcare facing end-of-life (EOL) raises challenges of overuse of invasive technology, underuse of palliation, suffering of patients and families, serious dilemmas, conflicts and heavy costs. Studies show the feasibility of training residents to handle these challenges with improved communication skills. An intervention was designed to promote quality of EOL care in a large healthcare organization, by training physicians and nurses to improved knowledge and communication skills.

**Methods:** An ongoing program was initiated in June 2012 in the 10 hospitals of Clalit Health Services. We developed a one-day workshop for team members, including physicians, nurses from departments of internal medicine, geriatrics, dialysis and general intensive care. The training used simulation with actors on EOL scenarios followed by debriefing group discussions, constructive feedback and an opportunity to explore challenges for optimal EOL care. Surveys evaluated knowledge and attitudes of participants: before, immediately after and several months after workshops.

**Results:** A total of 909 physicians and nurses participated in workshops. Most participants reported significant improvement in communication skills, knowledge and self-efficacy for EOL care. Participants expressed greater ease in discussing preferences for EOL care with patients and families, in supporting them in decision-making, and in providing palliative care. At the end of the workshop, 93% of the respondents stated that they plan to initiate more talks with patients and families, and 87% expressed that they will handle such talks differently than they had in the past.

At simulations, it became apparent that to avoid the emotional burden of death, physicians engage in cognitive talk about physiological changes of dying, final diagnostic categories, biomedical options and legal issues – neglecting the affective needs of patients and families. Discussions and feedback emphasized that satisfaction is higher when care providers talk less and listen more - stressing the value of silent presence, active listening body language and emotional intelligence rather than cognitive skills. Facing dilemmas and conflicts, the process of decision-making appears more important than the decisions reached, with respect and support to relatives and team members holding different views. For the participants, the workshop may help reduce burnout and enhance personal growth and professional fulfillment. At a late survey, most respondents reported improved handling of EOL challenges.

**Conclusion:** Simulation training of healthcare providers appears to be a valuable tool to improve EOL care. Implementation of this intervention in all hospitals of our organization seems to have a positive effect on organizational culture.

#### ISQUAI6-3180

##### THE IMPACT OF AN INNOVATIVE PATIENT-CENTERED CARE MODEL ON PATIENT AND FAMILY EXPERIENCE IN ACUTE CARE

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**Objectives:** To assess the impact of an interventional patient-centered care model which was designed to address patient expectations and improve patient and family experience during hospitalization.

**Methods:** Based on our previous studies [1–3], we developed a structured, pro-active, patient-centered care model (Patient-SatisfActive model) comprised of interpersonal communicative steps between clinicians and patients that aims to improve patient experience during hospitalization. The model incorporates clinicians' efforts to ascertain, address and document patients' needs, expectations and perceptions throughout hospitalization as well as to engage patients/families in their care.

We preformed this prospective pre-post study in Intensive Care Units (ICU) at a large tertiary care center in the USA. The intervention consisted of the Patient-SatisfActive model and a patient's

online portal to view health information, participate in the care plan, and communicate with providers. We measured the impact of this intervention on patient and family experience and dignity/respect outcomes by using the 'Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey and the FS-ICU 24 survey; validated tools used to evaluate patient/family experience in acute care setting.

**Results:** We included 2,105 patient admissions, 1,030 in the baseline period and 1,075 during the intervention. Demographics were similar during baseline and intervention. All 219 physicians (90.4% residents) and 92 nurses working in the ICU during the intervention period were trained and participated in the intervention. The majority of provider participants (91% physicians and 79.3% nurses) worked in the ICU during the baseline period. Satisfaction improved markedly from an overall hospital rating of 71.8 (95% CI, 61.1–82.6) to 93.3 (95% CI, 88.2–98.4,  $p < .001$ ) for patients, and from 84.3 (95% CI, 81.3–87.3) to 90.0 (95% CI, 88.1–91.9,  $p < .001$ ) for family members. Various other scores indicated a statistically significant improvement in patients and family dignity and respect outcomes.

**Conclusion:** This innovative team communication and patient engagement program substantially improved patients and family members overall experience and satisfaction during hospitalization. Our data show that this proactive, structured and practical approach has the potential to improve patient/family experience in real-time.

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#### ISQUAI6-2578

### CAN PATIENT INVOLVEMENT IMPROVE PATIENT SAFETY? A CLUSTER RANDOMIZED CONTROL TRIAL OF THE PATIENT REPORTING AND ACTION FOR A SAFE ENVIRONMENT (PRASE) INTERVENTION

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**Objectives:** To evaluate the efficacy of a patient feedback intervention (PRASE). This hospital intervention **comprised** two tools: i) a questionnaire which asked patients about factors contributing to safety (PMOS) ii) a proforma for patients to report both safety

concerns and positive experiences (PIRT). A report to wards was produced summarising this feedback and action planning meetings were organized with ward staff to develop improvements in safety to address this feedback.

**Methods: Design:** A multi-centre, cluster randomized controlled trial

**Setting:** Thirty three hospital wards across five hospitals in the UK.

**Patients:** All patients able to give informed consent were eligible to take part. Wards were allocated to the intervention or control condition.

**Measurements:** Primary outcomes were routinely collected harm free care (HFC) scores and patient feedback on safety (PMOS).

**Results:** Intervention uptake and retention of wards was 100% and patient participation was high (86%). We found no significant effect of the intervention on any outcomes at 6 or 12 months. However, for new harms (i.e. those for which the wards were directly accountable) intervention wards did show greater, though non-significant, improvement when compared to the control wards. These differences were largest for wards that showed the greatest compliance with the intervention.

**Table 1** Summary of 12 month primary outcome results

	Difference (95% CI)	p-value
<b>PST</b>		
Primary analysis	-0.03 (-3.59 to 3.53)	0.99
New harm	1.60 (-0.62 to 3.83)	0.15
New harm CACE (50% compliance cut off)	2.42 (-1.38 to 6.22)	0.19
New harm CACE (75% compliance cut off)	5.38 (-3.89 to 14.64)	0.24

**Conclusion:** Patients are willing and able to provide feedback about the safety of their care using the PRASE measurement tools and hospital staff are receptive to using this to inform safety improvements. However, we were unable to demonstrate any overall effect of this intervention on measures of patient safety.

#### ISQUAI6-2368

### THE EFFECT OF A PATIENT CENTRED CARE BUNDLE INTERVENTION ON PRESSURE ULCER INCIDENCES (INTACT)

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**Objectives:** Hospital acquired pressure ulcers (HAPU) are a serious patient safety concern, resulting in poor patient outcomes and high healthcare costs. We developed a patient-centred pressure ulcer prevention care bundle (PUPCB) with input from patients,

nurses and other health professionals. The objective of this study was to test the effectiveness of this PUPCB on incidence of HAPU in at-risk hospitalised patients.

**Methods:** This cluster randomised trial recruited tertiary hospitals with >200 beds in three Australian states. Patients were eligible if they were:  $\geq 18$  years old; at risk of PU because of limited mobility; expected to stay in hospital  $\geq 48$  hours and able to read English. Hospitals (clusters) were stratified in two groups by recent HAPU rates and randomised within strata. The PUPCB was multi-component, and was aimed at the patient and nurse. There were three messages for patients' participation in PUP care: keep moving; look after your skin; and eat a healthy diet. These messages were delivered as one-to-one patient education using a DVD, poster and brochure as resources. Nurses in intervention hospitals were trained in partnering with patients in their PUP care. The statistician, recruiters, and outcome assessors were blinded to group allocation and interventionists blinded to the study hypothesis (tested at both the cluster and patient level). The primary endpoint, incidence of HAPU, was detected by daily skin inspection. Data collection occurred from June, 2014 to May, 2015. The trial was registered with the Australian New Zealand Clinical Trials Registry (registration number ACTRN12613001343796).

**Results:** A total of eight hospitals and 200 patients per hospital were recruited and 799 patients per group analysed. The mean ( $\pm$ SD) time spent delivering the intervention to each patient was  $9.5 \pm 5.4$  minutes. Cluster adjusted, patient level analysis controlled for potential confounders yielded an adjusted hazard ratio of 0.58 (95% CI: 0.25, 1.33;  $p = 0.198$ ) in the PUPCB group. At the cluster level, the HAPU incidence rate in the PUPCB group was 9.6 per 1000 days and in the control group it was 20.1 per 1000 days, with an incidence rate ratio of 0.48 (95% CI: 0.33, 0.69;  $p < 0.0001$ ).

**Conclusion:** The evidence indicating effectiveness of our intervention is unclear with the patient level analysis showing a 42% average reduction in HAPU rate in the PUPCB group, however, confidence intervals indicate that there may be a reduction of 75% or an increase of 33% in HAPU rates. The PUPCB is simple to implement and based on current clinical practice guidelines.

## ISQUAI6-2418

### FAMILY AND CAREGIVERS ARE AN INTEGRAL PART OF HOME CARE SAFETY

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**Objectives:** This presentation will feature national evidence collected over the past 10 years from seniors receiving homecare services in 7 Canadian provinces. This program of research showcases the multiple meanings and influences on the broadened

conceptualization of homecare safety including emotional, social, and functional safety from the perspectives of clients, family/caregivers, and providers.

**Methods:** Caregivers are family members and friends who enable and support homecare clients to receive care at home. In 2012, 28% of Canadians 15 years of age or older, spent a median of 4 hours a week providing help or care to a relative or friend with a chronic health problem. Caregivers are increasingly relied upon by the health system to provide 70–75% of the care required at home, with little or no attention paid to the caregivers' health, safety, concerns, or preoccupations.

This research represents the product of multiple complementary and interconnected studies led by an interdisciplinary pan-Canadian team of knowledge users and researchers. Using a mixed method design, client and caregiver interviews were followed by photo "walkabouts" where participants visually guided the interviewer through their daily experience of managing at home. The concerns or strategies that were pointed out were captured on digital camera. Focus groups were conducted with regulated professionals and non-regulated home support workers about safety in home care.

**Results:** The most compelling and consistent finding across this pan-Canadian program of research is that the safety of the client is inextricably linked to the safety of their family and caregivers, regardless of the focus of each homecare safety study (i.e., palliative, medication management, multiple chronic illness). Some key safety risks specifically associated with caregivers include how the physical and emotional toll is a source of distress for caregivers. Caregivers, regardless of their age, personal health, work obligations, or family situation often feel pressured to assume care of a family member/friend because there are few options available. In institutions, 24-hour care is primarily provided by experienced and regulated care providers; at home, caregivers are often unprepared for the extent of the care they have to give. Caregivers find themselves responsible for complex, around-the-clock care such as helping with mobility, toileting and pain control and possibly dealing with confusion and wandering. Caregivers' inevitable fatigue is a potential safety risk to clients because it affects decisions about medication or care. Fatigue and the psychological and physical impact of stress on caregivers also lead to depression or substance abuse, endangering both caregivers and clients with the potential to lead to physical and psychological abuse. These factors add up to a significant risk that caregivers may become patients themselves, ultimately increasing, rather than easing, system demand for healthcare.

**Conclusion:** This cumulating body of evidence is highly relevant for practice and decision-making given the shift both in Canada, and internationally, of healthcare services from institutions to the home and community. The national results collected over 10 years clearly indicate that the safety of caregivers and clients are intertwined and threats to the safety of family and caregivers must not be severed from client safety. Focusing on the client and caregivers as the "unit of care" will mitigate risk, help to ensure seamless quality care, and better support for caregivers and clients. Recommendations for actions, relative to the identified risks, at different levels of the system will be discussed.

## ISQUAI6-2352 STREAMING QUIET TIME TO ENSURE ADEQUATE REST FOR PATIENTS

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### Objectives

1. Reduce the noise levels from 70.34 dB to 45 dB within a period of 6 months
2. Initiate & enhance compliance to 'Quiet Time' of 2hrs during the day within a period of 6 months by:
  - Restricting patient movement during quiet time to & from inpatient floors from 25% to less than 10%
  - Restricting people movement in patient rooms from 9 to less than 3
  - Patient feedback about noise being a cause of inadequate rest is 0%

**Methods:** The study was conducted using the DMAIC process. During nursing & management rounds there were increased complaints by patients with regards to inadequate rest in the afternoon. Inpatient feedback forms also revealed similar complaints. A SIPOC analysis was done to understand the problem in detail. Various tools were designed & used to measure the current problem under study, listed as follows.

**Questionnaire for patient feedback:** 29.03% of patients said that they did not get adequate rest in the hospital & 61.11% of those patients attributed it to the noise levels in the hospital.

**Decibelometer readings:** 2 readings in each shift over a period of 1 month was measured in the inpatient floors. The average decibel levels prior to Quiet Time implementation was 70.34 dB.

**Observation of people movement in the patients room:** Two observers were appointed to observe the entry & exit of various people in the patients room. The maximum average frequency of people movement (healthcare providers & other s) was 9.03 & minimum being 5.36.

**MIS report of Patient movement:** A MIS report audit of patient movement during the day was conducted. This included patient movement from the ICU to the inpatient area and patient movement from the inpatient area to diagnostic areas. The average patient movement was 24.56% during 2-4 pm.

### Corrective measures implemented

1. Streamlining the afternoon rest time for patients by following 'Quiet Time'. An ambience of Quiet Time was created by dimming the corridor lights between 2pm-4pm. To ensure that all hospital staff follow Quiet Time training was provided & an easy acronym was created to **STREAM** the activities
  - **S**peak quietly
  - **T**urn your phones to silent mode
  - **R**emember to ask "Is there anything else I can do for you Sir/Madam?" to ensure that all patients needs are taken care of before the quiet time
  - **E**nsure that the lights are dimmed out
  - **A**void entering a patient room, unless necessary

- **M**inimize patient transport
2. Planning the hand off time with an overlap of 2 hours between morning & afternoon shift (1pm-3pm) in a way that all patient related activities were completed by 2 pm & not interfere with the Quiet Time
  3. Avoiding the unnecessary movement of food trolleys & tray clearances
  4. Restricting movement in the patient's room to minimal
  5. Planning & scheduling the diagnostic procedures & transfer in of patients from ICU before or after the Quiet Time.

**Results:** Patient feedback about noise being cause of inadequate rest decreased from 61.11% to 0%

- Reduction in noise levels from to 70.34 dB in the month of Jan'15 to 50 dB.
- Reduction of average people movement from 9.03 to 2.43
- Reduction of patient movement from floors to diagnostic areas & from ICU to floors reduced from 23.48% to 9.91%.

**Conclusion:** Control phase

- The following measures are taken to maintain the Quiet Time
- **S**TREAM Standee at the entrance of the hospital & on every ambulatory floor to create awareness.
  - Nursing team leaders of each inpatient units are made responsible to ensure that STREAM activities are being followed.
  - Electrical switches to be switched off for dimming identified with '**Q**' mark.

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## ISQUAI6-2496 CARE ACROSS THE CONTINUUM: SUPPORTING WOMEN CONCERNED ABOUT BREAST CANCER IN GENETICS AND ONCOLOGY SETTINGS

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**Objectives:** The 'Lives at Risk' study, funded by Tenovus Cancer Care, had the following objectives to: a) improve service provision for women who had had at least one episode of breast cancer or were at risk of developing breast cancer, b) clarify risk assessment management across the care continuum, and c) examine how different assessments affected women's lives.

These objectives were developed within the context of a disease type that worldwide accounts for more than 4 in ten (42%) of all new cancer cases each year, and in the U.K alone 55,000 diagnoses each year, 2,300 of which are in Wales.



**Methods:** This study followed an intra-method design with: a) women with a previous personal history of breast cancer undergoing risk assessment by oncologists and b) women with no previous personal history but familial links, assessed by genetics specialists. The study took place in one large Welsh, National Health Service (NHS) hospital, between 2014 and 2015 where women were frequently moved between genetics and oncology teams to clarify 'at risk' classifications.

Women who consented to participate created 'Books of Experience' disclosing what it meant to be classified as 'at risk', and aspirations for good management across the continuum of health care services. Women discussed breast cancer over the life-course. The 'Books' mixed imagery with text, biography and autobiography, and service documentation [1]. Women undertook bi-photographic elicitation interviews and joined a Stakeholder Forum with other mixed groups to clarify expectations for cross-disciplinary care. Thematic and visual analyses led to emergent, culturally-, time- and disease-specific patterns of meaning.

**Results:** 24 women participated. Assessment across the continuum of both disease progression and support services revealed women's innermost fears about impersonal care. Women were as confident in having a named nurse specialist as they were lacking in confidence about being moved between teams, which was described as bringing discord and disjuncture to their lives and relationships. Being released from in-hospital care and sent to respite care also worried them, as did having care packages shared between clinicians, which was disconcerting. Indeed, analogies were made with prisoners' experiences of finishing a lengthy jail sentence, where they find themselves yearning for the safety and security of the prison walls. Women wanted smooth transitions from one state-of-play to another and for many that meant named practitioners.

**Conclusion:** Care across the continuum is acceptable if women experience personalised care provided by named individuals. Individualised care that is well-planned in advance of treatments or risk assessment is considered the optimal arrangement. For this to happen, organisations need to manage an integrated service delivery and patient-centred care. This will not only reassure women that their needs are aligned with routine clinical practice, but that there will be a smooth transition from in-hospital care to community support services.

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#### ISQUAI6-1722

#### PREDICTING PEDIATRIC READMISSIONS

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**Objectives:** Reducing readmissions is important to provide patients with the best care, but also to control healthcare costs. Most modes to predict which patients will be readmitted are based on adults. We undertook this study to create a useful algorithm for clinical staff that predicts risk of hospital readmission within 30 days for pediatric patients.

**Methods:** This retrospective study included hospital inpatients ages greater than 28 days to 17 years old, discharged from Mayo Clinic Rochester, Minnesota, USA from January 1<sup>st</sup>, 2013 to September 30<sup>th</sup>, 2014 (n = 5,627 admissions/3,627 patients). Readmissions were defined as inpatient stays at our institution starting within 30 days of initial hospitalization. Separate Cox regression models were fit utilizing the least absolute shrinkage and selection operator (LASSO) to select risk factors for time to hospital readmission and to estimate their impact based on a) factors known at admission and b) factors known at discharge. Candidate predictors included patient demographics (gender, age, insurance), diagnosis categories for reason for admission, selected comorbidities and a summary count (diabetes, depression, oxygen dependence, pneumonia, catheter, and bronchiolitis), complex chronic conditions (gastrointestinal, neurologic/neuromuscular, cardiovascular, respiratory, hematologic/immunologic, metabolic, congenital/genetic defect, malignancy, technology dependence, transplantation, renal/urologic, using the macro defined by [1]), surgeries and other procedures performed during the stay, medication counts at time of admission and discharge, previous hospitalizations within year of admission, emergency admission, hospital transfer, and whether the patient was on a primary care panel within our system. Data was censored at date of readmission for planned readmissions (defined by the US Centers for Medicare and Medicaid Services). Each admission was treated as a unique event within the model (i.e. model did not take into account patient could have multiple admissions).

**Results:** Of the 5,627 encounters, 558 had unplanned readmissions within 30 days, while 298 (34.8% of all readmissions) had planned readmissions. The number of medications at time of admission, previous hospitalization stays, the number of complex chronic conditions and a current malignancy were identified as predictors of readmission within 30 days for the admission model. No interactions were significant between predictors. The model produced an AUC of 0.728. The model based on discharge information included the number of medications at discharge in addition to all the factors found at admission. The discharge model produced an AUC of 0.738. Cancer patients had readmission rates almost three times higher than non-cancer patients. Higher values of the other variables were associated with higher likelihood of readmission.

**Conclusion:** Risk factors for pediatric patients are different than those for adults. The LACE model [2] to predict adult readmissions emphasizes the influence of comorbidities. Our pediatric model identified the importance of the number of medications, prior hospitalizations and presence of cancer in addition to count of major chronic conditions. Interestingly, only the number of discharge medications was added to the best admission model based on complete discharge related data.

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## ISQUIA16-2242

### GOT PILLS? A PHARMACIST'S IMPACT ON CHRONIC DISEASE AND OLDER ADULTS IN TRANSITIONS OF CARE

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**Objectives:** To assess the impact of medication reconciliation by clinical pharmacist on patient outcomes during transitions of care.

**Methods:** In 2012, a Transitional Care team was formed to improve care during the transition of patients from hospital to home. The team consisted of Advanced Practice Registered Nurses, one geriatric certified Registered Nurse, one Master Licensed Social Worker, and one Pharmacist.

The pharmacist reviewed hospitalization record of each patient discharged with heart failure, pneumonia, and COPD that met the Transitional Care model criteria. The pharmacist then contacted patients 24 hours after discharge. Medication reconciliation was attempted on all willing participants, medication counseling done and patient teaching performed. Pharmacist referred patients to Transitional Care geriatric certified RN, or Social Worker as needed. Providers were consulted to address any medication concerns disclosed by the pharmacist during the medication reconciliation process. If medication changes were ordered the patient was informed and the pharmacist followed up to ensure the patient was adherent and comfortable with the new medication plan.

**Results:** During the 3 year project the pharmacist reviewed 1,546 patient cases immediately following discharge. 1,033 of these cases (67%) received a complete medication reconciliation with the pharmacist. The remaining 513 cases received a medication review. Average time spent with patient performing medication reconciliation was 27 minutes. 427 Consultations were recorded as well. Some patients received more than one medication reconciliation as they were hospitalized and discharged into the Transitional Care program more than once. When a medication discrepancy was disclosed, patient side effect reported, or non-adherence discovered, the patient would be counseled and the Provider notified via internal communication system or by phone. The pharmacist would continue to follow patient until the issue was resolved or in the process of, led by the Primary Care Physician.

Under Provider orders dosages were adjusted 21% of the time for patient safety, comfort, or better disease management (i.e. heart

failure) 19% of patients were educated on their chronic disease and the importance of medication management. This interaction resulted in increased adherence. 23% of pharmacist/patient interaction resulted in initiation of a new medication. Antibiotics, PPI's, SSRI's, ASA 81 mg are the most common examples. 14% of this interaction resulted in a medication being discontinued; these included both prescription and OTC medications. In a 164 interactions (24%) The "other" interventions include;

- o Provider/Patient counseled, recommendation made, recommendation refused
- o Held medication waiting for consult with Provider, then resume
- o Changed medication regimen for optimal results
- o Required medication left off of discharge medication list, Provider contacted, corrected

Medication Discrepancies were also analyzed and reported to educate team on opportunities to improve medication reconciliation at discharge. The following discrepancies noted when the patient arrives home after hospitalization: prescribed drug not taken (44%), taking drug not prescribed (31%) and error in drug dose regimen (25%).

**Conclusion:** Medication Reconciliation exposes inappropriate drug therapy, duplications, non-adherence, polypharmacy, drug interactions and incorrect dosing. Most of these seem to occur as a result of communication breakdown. The pharmacist has a critical role in ensuring medication safety in transitions of care.

## ISQUIA16-3152

### COORDINATING CARE ACROSS THE CONTINUUM BY MANAGING POST DISCHARGE TRANSITIONS AT HOME

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**Objectives:** Discharging patients from hospital is a complex process. Even though discharge preparations start well in time, readmissions resulting from gaps in home care are a common occurrence. The project aimed at improving access to care for post discharge patients, ensuring timely response to patient concerns and reducing preventable readmissions.

**Methods:** A multidisciplinary team consisting of physicians, nurses and administrative staff was formulated. The team utilized Deming's PDCA cycle of quality improvement. Retrospective data of readmissions in ward and admissions in Emergency Room were analyzed. In Q3, 2015, 03 patients per month were seen in ER and 01 required inpatient admission on an average. The team also conducted a verbal survey from patients coming for follow-up appointments, according to which patients found it difficult to access a healthcare professional in hospital from home. The team then developed a plan to bridge the access gap. A "*Patient Hotline Service*" was piloted in General Surgery. Every patient being discharged now gets the hotline number to call on to when needed. The call is received by our trained clinical

nurse coordinator who then responds to the queries accordingly. In addition to the hotline, “*Patient Follow-up Calls*” were also introduced. Our nurse coordinators call every discharged patient after 24 hours to follow-up on patient’s condition and advice according to the clinical status accordingly.

**Results:** During the pilot phase of 03 months, 152 calls were received on hotline while 338 calls were made as follow-up. All queries were responded timely. A third-party neutral satisfaction survey for hotline service was also conducted which revealed that 95.4% patients were highly satisfied with the service and 97.4% found the nurse to be very polite and helpful. Moreover, readmissions have reduced to 01 and 0.3 per month in ER and ward respectively.

**Conclusion:** The discharge follow-up interventions implemented here were developed with the combined purpose of promoting continuity of care, improving quality of health outcome and reducing costs by proactive approach towards identifying and solving patients’ concerns.

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#### ISQUIA16-1142

##### IS READMISSION POLICY PENALISING HOSPITALS FOR KEEPING PEOPLE ALIVE?

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**Objectives:** Over the past 15 years emergency admissions (EA) in England have increased by 47 per cent to 5.3 million in 2012-13, yet the population has only grown by 10%. EAs are costing the English National Health Service (NHS) £12.5 billion and are accounting for two-thirds of all hospital bed days. There are several explanations cited for this, including: the aging population; a shift to provide more day-case care; accident and emergency arrival targets; and a move from block contracts to payments by results, which is argued incentivises hospitals to admit more patients and discharge them more quickly.

However, new medical technologies and improvements in patient safety has simultaneously meant that more patients now survive hospital admission, indeed the in-hospital survival rate in England improved by almost 5 per cent between 2000–01 and 2009–10. These patients, who would previously have died in hospital, are likely to be frailer than other patients and might require subsequent hospitalisation. However, to date no research has considered the impact of improved quality and safety of care on EAs.

This study tests the hypothesis that improved quality is an important factor in explaining the recent rapid increase in EAs witnessed in the English National Health Service (NHS).

**Methods:** This population-based retrospective cohort study with case-control examines the impact of improved NHS hospital performance – in terms of patient survival – on volume of subsequent

EAs to hospital in England over the period April 2000 to March 2010. This is done for three conditions that have a substantial risk of mortality – hip fracture, acute myocardial infarction and stroke – as well as for all EAs. As a placebo, comparisons have been made with an analogous cohort of patients admitted for cataract surgery for whom mortality is close to zero.

The major data source used is the Hospital Episodes Statistics (HES) database. This contains details of all NHS funded patients admitted to public and private hospitals and treatment centres in England. For each of the five cohorts of patients a patient level probit model for initial survival is estimated, followed with estimations of a patient-level negative binomial model for the count of the number of subsequent EAs for each cohort following the survival upon initial admission.

**Results:** The study finds a strong link between improved hospital survival rates and increased future utilisation of emergency care. The placebo cohort undergoing low-risk cataract surgery finds a much smaller effect, indicating that most of the identified link is due to the improved quality of care in the form of reduced mortality in high risk patient groups. The analysis finds for the all emergency cohort a one percentage point improvement in hospital survival is associated with an additional 0.019 emergency admissions per patient within 365 days, and an additional 0.027 within 730 days.

Around one-third of the total rise in emergency admissions observed between 2000 and 2012 can be explained by improved survival rates: this improvement is estimated to have cost the NHS around £1.3 billion in 2012 (or 10.3% of the total cost of emergency admissions reported by all NHS hospital trusts).

**Conclusion:** These results suggest that the success of hospitals in improving survival outcomes for life-threatening emergencies may be an important contributory factor to the increase in emergency admissions. The findings indicate that current policies that have penalties on providers who record an increased number of emergency (re)admissions are potentially misguided because such (re) admissions in part reflect improved survival. Such policies would be penalising hospitals for keeping people alive.

**Disclosure of Interest:** D. Patel Other: The Health Foundation funded this research, M. Laudicella: None Declared

#### ISQUIA16-2008

##### IMPROVING EFFICIENCY IN HEMATOLOGY LABORATORY

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**Objectives:** It was observed since past one to two years that growth in section of Hematology of Clinical Lab was hampered for new and specialized tests. Improvement in report turnaround time is restricted to 24hrs. for Complete Blood Count (CBC) test which is affecting about 40,000 patients per month. In order to improve customer service, there was a need of an innovative approach. In this scenario, the objective or the goal of the project arises as:

“Improving efficiency in section of Hematology through reducing turnaround time from 24hrs. to 12hrs. for all Complete Blood Count (CBC) samples received by November 2014.”

**Methods:** Methodology used was Lean Six Sigma Roadmap which includes following:

Define, Measure, Analyze, Improve, Control (DMAIC)

#### Results

1. Reporting of CBC results reduced from 24 – 12 hrs. with report completion rate of about 99%.
2. With the induction of barcoding and automation:
  - (a) The average sample analysis time was reduced from 1.3 minutes/sample to 0.64 minutes/sample.
  - (b) The average rate of slide preparation per sample was reduced from 1.24 slides/sample to 0.34 slides/sample.
  - (c) Slide rejection and re-staining is significantly reduced by factor of 1/6<sup>th</sup>
3. New process has completely eliminated the requirement of print out with the provision of abnormal results flagging. Hence annual saving of 0.2 Million Rupees and saving of 31 labor hours/month by avoiding unnecessary printout.

**Conclusion:** This was a Lean Six Sigma Green Belt Project which utilizes the methodology of DMAIC (Define, Measure, Analyze, Improve & Control). This methodology proved to be very useful in identifying wastes as well as improving the efficiency of processes. The concept of “walk through the process” was very effective in identifying gaps.

The team concludes as follows:

1. Barcode printing and scanning reduces delay in process of CBC reporting as well as enhance tracking of sample at every step.
2. Throughput of analyzer reduces from 80 samples to 150 samples per hour.
3. Slide preparation and staining reduces from 100% to 40%.
4. Slide rejection rate decreased to 2% from 70%.
5. Printing of initial results reduces from 100% to 10%.
6. Manual platelet counting was substituted with automated optical platelet count which in turn saves about 2hrs. per sample time of technologist.
7. Decrease in slide rejection rate speed up the process of CBC reporting.
8. Eliminating the step of printing initial results saves time of one staff which was then utilized to start the reporting of Malaria Thick Smear in the same capacity.

#### ISQUA16-2413

#### THE IMPACT OF NEW PAYMENT MODELS ON CARE DELIVERY: REDUCTIONS IN EMERGENCY CARE USE AMONG BENEFICIARIES IN A MEDICARE PIONEER ACO

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**Objectives:** Changes in care delivery patterns represent one mechanism for reducing medical spending growth while preserving or improving quality. For example, many visits to the Emergency Department (ED) are for conditions that could be addressed in lower-cost outpatient clinics, or could be avoided altogether with better outpatient access. Using 2009–14 Medicare claims for a large Pioneer Accountable Care Organization (ACO), we examined whether ACO entry or intensive care management receipt was associated with Medicare beneficiary ED visit rates.

**Methods:** Beneficiaries could join the ACO between 2012–14 (Pioneer contract years); we focused on the first two cohorts of entrants (entry in 2012 or 2013) to allow for at least two years of post-entry data, then compared ACO-entrants with those who had yet to join. The ACO also identified high-risk beneficiaries and enrolled them in an integrated Care Management Program (iCMP), which provided additional routes through which to receive care, beyond that available from their primary care physicians. Because of program capacity constraints, iCMP program entry was staggered. For both the ACO-entrants and iCMP entrants, we examined the pre-program trends in ED use for those who started earlier versus later, and found the trends to be comparable. We then examined changes in visit rates over time (within-person) for earlier versus later entrants, using Poisson or logistic regression models with individual-level fixed effects, and adjusted for changes in risk scores (i.e., CMS-HCC scores), calendar month, and year. We examined ED visit rates overall, and then for conditions treatable with timely outpatient care. For the latter, we classified the ED visits using the NYU algorithm, i.e., using a 50% probability threshold that an ED visit was for conditions likely to be non-emergent or primary care treatable. We also conducted sensitivity analyses with different probability thresholds.

**Results:** There were 42,050 beneficiaries who entered the ACO in 2012, and 19,521 in 2013. Within the 2012 cohort, the ACO classified 11.2% beneficiaries as eligible for the high-risk iCMP program; of these, 65% started the program during the study period. Within the 2013 cohort, the ACO classified 11.7% beneficiaries as iCMP eligible; of these, 39.0% started during the study period. In adjusted models, ACO entry was associated with a 3.6% decrease in ED visit rates (95% CI: 1.5% to 5.6% decrease). ACO entry also was associated with lower odds of ED visits for outpatient treatable conditions (OR = 0.905; 95%CI: 0.872–0.941). Among the higher risk beneficiaries who were eligible for the iCMP program, starting the program was associated with an 8.0% decrease in ED visit rates (95% CI: 4.7–11.1% decrease). Program entry also was associated with lower odds of visits for outpatient treatable conditions (OR = 0.918; 95%CI: 0.857–0.982). Analyses altering the ED classification threshold yielded comparable findings.

**Conclusion:** Entry into a Medicare Pioneer ACO is associated with decreases in ED visit rates for all visits and visits for conditions treatable in outpatient clinics. Among the ACO population, entry into a high-risk care management program had similar additional effects. Alternative payment models such as those for Pioneer ACOs (e.g., shared upside and downside risk) could alter care delivery patterns, and thereby have the potential to slow medical spending growth.

**ISQUA16-1936****THE COST OF QUALITY TO PATIENTS: THE IMPACT OF SURGICAL COMPLICATIONS ON WELLBEING**S. ARCHER<sup>1,\*</sup>, S. VUIK<sup>2</sup>, A. PINTO<sup>1</sup>, and A. DARZI<sup>3</sup><sup>1</sup>Patient Safety Translational Research Centre, <sup>2</sup>Centre for Health Policy, and <sup>3</sup>Department of Surgery and Cancer, Imperial College London, London, United Kingdom

**Objectives:** Quality care in surgery is closely linked with the rate of complications. However, little is known about the impact of these complications on patient's physical and mental wellbeing. Nonetheless, they have a significant financial impact, as patients require mental, physical and social support, combined with a cost to society due to a loss of productivity. The objective of this study is to better understand the impact of surgical complications on physical and mental wellbeing.

**Methods:** Data were collected from 785 patients undergoing major surgery in 29 hospitals in the UK. Patients were surveyed pre-surgery, on discharge and at 1 month, 4 months and 12 months post discharge. Demographic and clinical information was collected alongside measures of wellbeing (SF12), anxiety and depression (HADS), social support (MDSS), and coping (Brief COPE). We used robust regression analysis to account for clustering within hospitals to understand the relationship between complications and wellbeing, whilst determining factors that might moderate this relationship, such as the presence of social support and patient coping styles.

**Results:** Of the 785 patients who participated, 379 patients had a surgical complication, of which 72 were rated as being 'severe'. The physical and mental recovery patterns varied by surgery type, with general surgery patients seeing a greater decline in general wellbeing compared to cardiac and vascular patients. There was a clear association between the severity of the complication and the physical and mental well-being post surgery; those with the 'severe' complications had poorer outcomes.

The results show that the effect of complications on wellbeing is time dependent. At 1 month, complications were shown to have a significant impact on mental and physical wellbeing. Significantly reduced physical and mental wellbeing is still evident at 4 months. At 12 months the difference in wellbeing between patients with and without complications is not significant except for mental wellbeing in patients with 'severe' complications. Social support was shown to have a significant positive impact on wellbeing at various time points. Coping strategies were also found to moderate the impact on wellbeing, with different patterns of coping being observed.

**Conclusion:** Complications significantly reduce physical and mental wellbeing over an extended period of time. During this period, it is expected that patients require additional resources and support, with an increased cost to health and social care systems. Social support from family members and health professionals can be instrumental to reducing the impact of these lapses in quality.

**ISQUA16-1524****IMPACT OF AGE AND RENAL FUNCTION ON INCIDENCE OF ADVERSE DRUG EVENT: THE JADE STUDY**Y. TAKAHASHI<sup>1,\*</sup>, M. SAKUMA<sup>1</sup>, and T. MORIMOTO<sup>1</sup><sup>1</sup>Department of Clinical Epidemiology, Hyogo College of Medicine, Nishinomiya, Japan

**Objectives:** Appropriate use of medication is special a concern in geriatric patients or patients with chronic kidney disease, but the relationship between such risk factors and incidence of adverse drug events (ADEs) is not well known. We investigated the effects of elderly and renal functions on the incidences of ADEs.

**Methods:** The Japan Adverse Drug Events (JADE) study was a prospective cohort study of patients admitted in 3 tertiary care hospitals, enrolling 3,459 patients. There were 1,010 ADEs during the hospitalization (1). We calculated the estimated glomerular filtration rate (eGFR) of 3,389 patients with creatinine values on admission. We divided the age into categories (<65; >=65 years) and the eGFR into categories (<30; >=30 and <60; >=60 ml/min/1.73 mm). We then analyzed the relationships between age or eGFR and incidence of ADEs. We also assessed the effect of ADE occurrence on length of hospital stay (LOS) and in-hospital mortality. As sensitivity analyses, we adjusted the number of medication use or excluded the patients who died within 3 days after admission because the relationship between ADEs and LOS or mortality were not assessable in such critical patients.

**Results:** Among 3,389 patients, 2,117 patients (62%) were 65 years or older, and 719 patients (21.6%) had at least one ADE. Among those who were 65 years or older, 517 patients (24%) had at least one ADE, and 202 patients (16%) in counterparts (P < 0.0001). There was a trend that the rate of ADEs became higher when eGFR became lower among patients younger than 65 years old, while there was no trend among patients aged 65 years or older (Table 1). When we excluded the patients who died within 3 days after admission, such trend was remained among younger patients though still not significant (patients younger than 65 years old; P = 0.06, patients aged 65 years or older; P = 0.4). The number of medication use became larger when eGFR became lower in both patients who were younger than 65 years old and who were 65 years or older (patients younger than 65 years old; P < 0.0001, patients aged 65 years or older; P < 0.0001). After stratified with age category, in-hospital mortality was significantly higher in patients with ADEs than those without ADEs (patients younger than 65 years old; 24(12%) vs 44(4%), P<0.0001, patients aged 65 years or older; 88 (17%) vs 133 (8%), P<0.0001). The mortalities of patients with ADEs were also higher than those without ADEs in each eGFR category (eGFR >= 60; 64(14%) vs 72(4%), P < 0.0001, 60 > eGFR >= 30; 31 (16%) vs 51 (9%), P < 0.0001, 30 > eGFR; 17 (23%) vs 54 (21), P = 0.7). LOS was longer in patients with ADEs than those without ADEs after stratified with either age category (patients younger than 65 years old; median of LOS 17 vs 6, P < 0.0001, patients aged 65 years or older; median LOS 24 vs 9, P < 0.0001) or eGFR category (eGFR >= 60; median LOS 20 vs 8,

$P < 0.0001$ ,  $60 > \text{eGFR} \geq 30$ ; 25 vs 8,  $P < 0.0001$ ,  $30 > \text{eGFR}$ ; 22 vs 6,  $P < 0.0001$ ). These findings are the same in the analyses after excluding the patients who died within 3 days after admission.

	$\geq 65$ year (n = 2177)			$< 65$ year (n = 1272)		
	Patients n (%)	ADEs n (%)	P value	Patients n (%)	ADEs n (%)	P value
Total (n = 3389)						
eGFR category						
$\text{eGFR} > = 60$	1211 (57)	289 (24)	0.9	1066 (84)	162 (15)	0.1
$60 > \text{eGFR} > = 30$	655 (31)	171 (26)		127 (10)	23 (18)	
$30 > \text{eGFR}$	251 (12)	57 (23)		79 (6)	17 (22)	

**Conclusion:** Both age and renal function were significantly associated with the occurrence of ADEs. After stratified with these significant risk factors, ADEs were still significantly related with higher in-hospital mortality and longer LOS.

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#### ISQUAI6-2875

##### THE BRAZILIAN PATIENT SAFETY PROGRAM - BUILDING A NETWORK TO HELP BRAZILIAN HOSPITALS TO IMPROVE QUALITY OF CARE OFFERED TO THE POPULATION

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**Objectives:** To create a network of collaboration and communication between Brazilian hospitals, who join voluntarily, generating a fundamental change in the culture of the hospitals, to exchange experiences, dissemination of best care practices, structuring clinical protocols related to the quality and safety of patient and promotion of training of multidisciplinary teams in order to continuously improve the quality of care in Brazil and the spread of a concept of intolerance to avoidable harm.

**Methods:** In 2008, the IQG – Health Services Accreditation (IQG) developed the Brazilian Patient Safety Program (PBSP). Through the voluntary participation of Brazilian hospitals, the Program promotes the dissemination of safety practices and the exchange of experiences among the participating institutions.

To facilitate the permeability of interventions across the network and to promote the exchange of experiences, a pyramid structure was adopted, with a group of multipliers hospitals. Each multiplier is the reference five other participant hospitals, thus configuring sharing cells. All these cells are then referred to the national coordination of the program.

In 2011, through a Technical Board, the PBSP made the first adaptation of “bundles” of prevention of infections worldwide known and applied, turning them into three clinical protocols directed to the Brazilian reality, namely: VAP Prevention Clinical Protocol, CLABSI Prevention Clinical Protocol and CAUTI Prevention Clinical Protocol. In 2013, from a new need identified by the members, the Technical Board launched the Early Identification of Sepsis Clinical Protocol.

The compliance to the markers of the protocols, as well as the outcome indicators, are monitored through a data collection platform, where the participating institutions voluntarily input the data relating to their management. This enabled the creation of a national database with information related to the management of the protocols throughout Brazil, allowing the comparison of results between the participating hospitals.

Alongside this the technical coordination of the Brazilian Patient Safety Program invites members to share their experiences in the improvement of quality and patient safety through a communication platform and monthly meetings made by web-conference, which allows communication to happen throughout the country.

**Results:** Since the development of the Program monitoring we have seen a growing interest of hospitals to integrate the network and participate in protocols and suggested practices. The number of participating hospitals grew 35.8% in 2014, reaching 117 in late 2014, and 21% in 2015, reaching 142 in the beginning of 2016. The participant organizations are spread in 23 out of the 27 Brazilian states. The monitoring of ICU beds was raised by 42% in 2014 and 15% last year, reaching 5,465 beds at the end of 2015. The analyzed data of different protocols monitored by the Program showed an increase in compliance to the markers, increased effectiveness in preventing infectious complications and a decrease trend in the density of incidence of infections.

**Conclusion:** Our results demonstrate effectiveness of the Brazilian Patient Safety Program to promote the exchange of information between participating institutions and spread the culture of the patient safety among the hospitals of the country. The progressive increase in the number of hospitals and monitored ICU beds, as well as the impact of the implementation of clinical protocols in reducing the incidence of assistance-related infections, endorse the PBSP as an effective network in promoting patient safety culture and improving the quality of care in Brazilian hospitals.

#### ISQUAI6-1658

##### EXPLORING LATENT TEACHING STRESS AND COPING PROFILES AMONG CLINICAL TEACHERS AND EXAMINING ASSOCIATIONS

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**Objectives:** Since 2007, the Ministry of Health and Welfare (MHW) has supported and reimbursed each teaching hospital in executing training for post-graduate medical staff through the “Instruction Fee Reimbursement Programs for Teaching Hospitals.” Based on the spirit of patient-centeredness and inter-professional learning, these programs have invited 14 medical professional groups and specialists to establish

a post-graduate clinical training system and have made a positive contribution towards the improvement of the teaching quality of Teaching Hospitals. In the meantime, the Joint Commission of Taiwan (JCT) had noticed that a certain amount of stress related to teaching among clinical teachers in Teaching Hospitals had gradually appeared. Therefore, from 2012 to 2014, the JCT provided clinical teachers with “Teaching Stress Management Workshops” to reduce the teachers’ stress and investigated the stressors associated with teaching. This study aims to explore whether there were recognizable Teaching Stress Coping Profiles among clinical teachers and whether these profiles had associations with the demographics of the clinical teachers and the types of teaching hospital. The findings will help clinical teachers to maintain a good balance between teaching quality and their health.

**Methods:** A total of 1,710 clinical teachers of Teaching Hospital, classified into 4 types of teaching hospital, attended the Workshops. Before the formal session began, all participants completed the Teaching Stress, Coping and Satisfaction Questionnaire (TSCSQ), which measured main outcomes including Teaching Stressors Recognition, Perceived Stress, Coping Styles, Optimism and Teaching Satisfaction. Demographic data including Age, Education, Gender, Teaching Experience, Types of Teaching Hospital and Medical Professional Groups were also gathered by the TSCSQ. First, *K*-means clustering was used to partition participants into several clusters with different prototypes of coping stress profile according to their main outcomes. Then the ANOVA test was used to test the mean differences of the main outcome indices among the profiles. Finally, the Chi-square test was used to examine associations among types of stress coping profiles, the demographics of clinical teachers and types of teaching hospital.

**Results:** Results of the *K*-means clustering showed there were three recognizable Teaching Stress Coping Profiles among clinical teachers. The ANOVA test showed that all of the main outcome indices except for active coping and teaching satisfaction had statistically significant differences according to the profile. The results of the Chi-square test found that there were significant associations between profiles and Age, Education, Teaching Experience of clinical teachers and Types of Teaching Hospital, respectively. However, there were no significant associations between profiles and Gender and Medical Professional Groups of clinical teachers, respectively.

**Conclusion:** Different Teaching Stress Coping Profiles have been demonstrated from a large sample of clinical teachers in Taiwan’s Teaching Hospitals, with these profiles having associations with Age, Education, Teaching Experience of clinical teachers and Types of Teaching Hospital. This suggests an individualized teacher assistance program according to their Teaching Stress Coping Profiles, Demographics and Types of Teaching Hospital is needed in the future.

**ISQUIA16-2946**  
**FEASIBILITY OF POST DISCHARGE FOLLOW-UP**  
**CALL TO UROLOGY PATIENTS AT A PRIVATE**  
**TERTIARY CARE HOSPITAL IN KARACHI**

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**Objectives:** To assess the feasibility of post discharge follow-up calls by a nurse for patients admitted with urological problems.

**Methods:** This study was planned in II phases. In first phase from 08, October 2015 to 31<sup>st</sup> January, 2016 all discharged in-patients were included. From 20<sup>th</sup> October, 2015 surgical day care (SDC) patients were also included in the study. They were provided with complete discharge education and management at home at the time of discharge and they were also informed about follow-up calls by nurse within 24 hours. A record was maintained on excel sheet with patient information including presenting complaint and treatment during hospitalization. Patients were asked whether they have any problem or queries since discharge yesterday. Queries of patients were recorded and answered by nurse. In case of a problem beyond scope of nurse practitioner, on call resident was involved. In case of a problem requiring intervention or early medical attention, an early OPD/ER visit was arranged. The follow-up calls notes were documented in patients’ medical record by nurse. The data of patients reported issues was analyzed using Microsoft Excel 2010 percentages, and frequencies. In phase II Based on the record kept in phase I, a frequently asked questions fact sheets is being developed. A reference guide will be generated to help nurses to response to their queries in efficient way.

**Results:** Total 203 inpatients and 162 SDC patients were followed after discharge. The response rate to the call for inpatient was 76% and for SDC 51%, rest of the patients did not attend the calls after three attempts. Amongst patients who responded to call 74.1% had some concerns which required nursing intervention whereas, 25.8% had no issues. Most (96%) of the concerns were handled by nurses. The concerns shared by patients were usually related to routine postoperative changes e.g. most common were: Hematuria Dysuria, Pain, constipation, and others were heavy lifting, dribbling of urine, and concerns related to activity. Moreover, intervention was found effective in managing the patients concerns and patients appreciated the follow-up calls during post discharge first clinic follow-up as assessed by primary consultant.

**Conclusion:** Response of participants and measures of patient reported issues in this study show that this intervention is feasible and needed in our context.

**ISQUIA16-2520**  
**EDUCATING PHYSICIANS FROM THE CLASSROOM**  
**TO THE CLINIC**

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**Objectives:**

1. Educate clinicians about Quality methods to prepare them to take leadership roles in integrating Quality and Performance Improvement within their specialties

2. Train providers to succeed in the data driven Health Care reform environment by independently integrating Quality and performance into their daily practice and competency.

**Methods:** Our program provides a unique opportunity to empower providers and administrators to initiate change beginning at the early stages of training and throughout their career. Success and health care today requires everyone involved in health care to participate in Quality and Performance Improvement.

**Results:** Medical students learn quality by serving as academic detailers (parallel pharmaceutical detailers), teaching quality and performance improvement to practicing physicians. Residents are classroom educated on quality management fundamentals, tools, and philosophy, statistics and research methods through interactive web-based I-learn modules, direct personalized mentoring, and supervised performance improvement projects that often lead to publication. Clinicians are trained by quality professionals to lead data analytic usage groups at individual health care sites to become familiar with data interpretation and usage for performance monitoring and improvement.

**Conclusion:** The goal of this unique educational program is to develop quality and performance improvement training in all stages of the physician's career in order to help them succeed in the environment of quality measurements and big data. With education, clinicians can become independently competent in assessing quality and performance, integrate quality improvement into their daily practice, and help organizations become learning organizations in terms of analytics.

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#### ISQUA16-2682

### CHILDREN'S CARE PATHWAY AND PARENTAL EXPERIENCES FOLLOWING USE OF NHS 111, A NON-EMERGENCY MEDICAL HELPLINE IN ENGLAND

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**Objectives:** To study parents' experiences of using NHS 111, a non-emergency medical helpline in England, on behalf of their child under 16 years, and assess under what circumstances parents opt to use this service; what factors influence their decision to follow advice they receive; and explore whether the most appropriate care pathway was followed.

**Methods:** A Patient Reported Experience Measure (PREM) was developed and tested with parents who recently called NHS 111 on behalf of their child under 16 years for one of four common childhood conditions: fever; diarrhoea/vomiting; breathlessness; or constipation. A variety of care pathways could be explored by focussing on these conditions, as the first three may require varied responses from urgent-care-services, whereas constipation is mostly managed in primary care. The PREM was developed based on findings from four focus groups conducted with parents of children under 16 who had used the service, which explored their experiences of the service as well as what was important to them during the call. The tool was cognitively tested with a similar population to check for comprehension and clarity, before being piloted employing a telephone survey methodology with parents who called NHS 111 in North West London between March-June 2015. A stratified approach was used to ensure roughly equal number of responses were obtained from all four conditions, and 1,000 surveys were completed in a four-week fieldwork period.

**Results:** Over half of the parents calling the NHS 111 service (53%) had done so as it was out of hours for their general practitioner. A fifth of parents (20%) called the service for advice or reassurance, and 13% believed the situation wasn't urgent enough for 999. A third of parents (34%) who did not have confidence and trust in the first call handler they spoke to, reported they did not fully follow the advice they received. That said, 86% parents who received a thorough explanation of why the advice was appropriate reported having more confidence and trust in the call handler. A composite score was created from four questions relating to parents' experience of the call, and revealed associations between a positive experience of the call and (i) parents feeling advice/action was right, as well as (ii) parents following the advice.

**Conclusion:** Reported reasons for using the service may suggest that NHS 111 served as a resource for parents when primary care services weren't available, thus the service possibly prevented them from relying on secondary care services such as accident and emergency for non-urgent concerns. PREM results highlighted the importance of parents' experiences on how effective the service can be. Receiving thorough explanations of the advice may increase parents' confidence in the call handlers. Further, feeling listened to, being involved in decisions, and having confidence in the call handler could impact parents' decision to follow the advice. Findings from the PREM therefore provided evidence that parents' overall experience of the call to the non-emergency medical helpline could influence decisions to follow advice and ultimately access the most appropriate care pathway for their child's needs.

#### ISQUA16-1955

### USING ROUTINELY COLLECTED ADMINISTRATIVE DATA TO FURTHER EXAMINE VARIATION IN OBSTETRIC OUTCOMES BY DAY OF THE WEEK

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**Objectives:** Recent published work demonstrated variation in birth outcomes by day of the week in English Public Hospitals. [1] Over the seven indicators examined, we found a statistically significant association consistent with a lower standard of care for babies born and women admitted over the weekend. The so called “weekend effect”. Perinatal death, injury to the neonate, puerperal infection and three day neonatal readmissions were all higher at weekends compared with weekdays. Our objective for this analysis was to examine whether previously unaccounted for case-mix factors could account for these variations.

**Methods:** We identified maternal and neonatal records in English public hospitals between 1st April 2010 and 31st April 2012 using a national administrative dataset. Using previously published case-mix adjustment variables [1] including gestational age, birth weight, maternal age, delivery method, ethnicity and socio-economic deprivation, we calculated the odds of three maternal outcomes (perineal tear, puerperal infections and three day maternal emergency readmissions), and four outcomes for babies (in-hospital perinatal mortality, injury to neonate, selected neonatal infections and three day neonatal emergency admissions) for weekend versus weekdays. We explored the effect of specifically excluding elective caesareans and antenatal still births and adjusted for induction of labour.

**Results:** We identified 1,332,835 deliveries and 1,349,599 births. After exclusion of elective caesareans, we found a persistently high risk at weekends of puerperal infections (OR 1.05, 1.00 – 1.09), in-hospital perinatal mortality (OR 1.07, 1.02 – 1.12) and of injury to the neonate (OR 1.05, 1.02 – 1.08) compared with weekdays. For perinatal mortality, the higher weekend risk persisted even after exclusion of antenatal stillbirths (OR 1.09, 1.02 – 1.16). After adjusting for induction of labour, puerperal infection rates remained higher at weekends (OR 1.07, 1.02 – 1.12)

**Conclusion:** The “weekend effect” for birth outcomes seems to persist, even after accounting for potential selection bias or misclassification of stillbirth date. Administrative data remain a useful starting point for examining variations in the quality and safety of health care. Further work is required to understand the potential reasons for these apparent disparities.

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#### ISQUAI6-1575

##### AUTOMATED IDENTIFICATION OF TRIGGERS FROM THE GLOBAL TRIGGER TOOL IN ELECTRONIC HEALTH RECORDS

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**Objectives:** To reduce resources used in trigger review in the Global Trigger Tool through an automated identification of

triggers using the electronic health record (EHR); to evaluate triggers identified in records and to compare the performance of computerized algorithms to manually review for trigger identification.

**Methods:** We developed computerized algorithms to identify 41 triggers within the EHR of non-psychiatric adult patients. We evaluated the number, types and presences of triggers identified by the computerized algorithms and compared the performance to a manual review in 1,063 records of discharged patients from January 1 to December 31 in 2013 from a Norwegian trust. The computerized algorithms were developed from inclusion and exclusion criteria within the EHR to identify the different triggers. The manual review is performed by two non-physicians that review each of the records to find triggers they agree upon after a consensus.

**Results:** The computerized algorithms identified 1,132 triggers and the manual review identified 847 triggers in the 1,063 records. The sensitivity of the computerized algorithms in presence of any triggers in the records was 0.95, specificity 0.77 and positive predictive value 0.78. The inter-rater reliability ranged from 0.35 to 0.92 for those triggers (n = 17) identified more than ten times by the manual review.

**Conclusion:** We found that our automated identification of triggers through the EHR has high sensitivity. The inter-rater reliability of the individual triggers varied but were substantial for 13 of 41 triggers. An automated identification of triggers can replace the manual review reducing resources used.

#### ISQUAI6-2575

##### A MIXED METHODS INVESTIGATION OF THE EFFICACY OF ORGANISATIONAL LEVEL FEEDBACK FROM INCIDENT REPORTING

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**Objectives:** Dissemination of data from incident reporting systems does not always result in improvement in systems and professional practice. The aim of this programme of work was to investigate the perceptions and experiences of healthcare professionals using organisational level feedback from incident reporting systems. In doing this, the objective was to understand and enhance the effectiveness of organisational level feedback from incident reporting systems and extract the characteristics and mechanisms by which it leads to improvement.

**Methods:** As part of work being conducted in the UK to understand requirements for future centralised reporting systems, a survey was circulated to registered users of the National Reporting and Learning System (NRLS). The survey was designed with reference to existing research on the characteristics of effective feedback for incident reporting and contained both quantitative and qualitative items. Descriptive statistics were employed to analyse the quantitative data. All free text responses were grouped and

categorised in relation to the key research questions. Alongside the survey, qualitative data from interviews with 17 international safety science experts both internal and external to healthcare was analysed drawing upon the principles of grounded theory.

**Results:** The survey had 320 respondents representing 49% of healthcare providers in the UK. 79% of respondents classified themselves as risk managers. 75% of respondents indicated that both doctor and nursing groups never used institutional feedback from the NRLS. However, 40% of respondents indicated that risk managers engage with feedback at least monthly. Respondents expressed agreement that feedback helps them to understand the strength of their reporting culture compared to others. They disagreed, however, that the data provides them with timely information that has a sufficient level of detail and specificity to respond rapidly to patient safety issues. Interviewees reported a range of perceptions and experiences of effective feedback from incident reporting. Eight concepts for effective feedback emerged from the qualitative dataset. These included having visible sponsorship from executive members of staff, preserving anonymity without compromising learning, rewarding reporters for their efforts, supporting prioritisation of resources for improvement, involving and engaging frontline staff in the safety improvement process, tailoring detail to specific audience(s), providing information at multiple points in the alerting and response process and supporting ongoing communication with relevant stakeholders.

**Conclusion:** Current organisational level feedback from incident reporting systems generally meets benchmarking needs and enables monitoring of data quality by healthcare providers. It is more likely to influence safety culture rather than effectively support improvement in systems and professional practice. This is due to a lack of detail and timeliness to ensure sufficient relevance and specificity for information to be adapted and disseminated throughout the organisation. This may go some way in explaining the perceived lack of engagement with clinical staff members. Risk managers are unable to fulfil their role as gatekeepers without further support from the feedback system. Feedback from centralised incident reporting systems should be communicated to healthcare providers in a detailed and timely way. It should be ensured that such feedback can be tailored for and targeted at specific clinical groups and individuals and disseminated onwards from institutional level.

### ISQUAI6-1878 ARE STATISTICAL NATURAL LANGUAGE PROCESSING MODELS FOR PNEUMONIA SURVEILLANCE GENERALIZABLE ACROSS ACUTE CARE HOSPITALS?

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**Objectives:** Natural language processing (NLP) models are increasingly used for adverse event (AE) surveillance in acute care hospitals, but limited information is available on their generalizability, which is important for valid benchmarking of AE data across institutions. We examined the generalizability of a statistical NLP model for identifying pneumonia from electronic health record (EHR) data; a common AE that is associated with significant morbidity, mortality and cost.

**Methods:** We randomly sampled 4,000 narrative reports of chest radiological examinations performed at a university health network (UHN) in Quebec (Canada) between 2010 and 2014. We manually identified pneumonia within each report, which served as our reference standard. We used a nested cross-validation approach to train and validate a support vector machine (SVM) model predicting pneumonia. This model was then applied to a random sample of 2,281 narrative radiology reports from another UHN in Ontario (Canada), and accuracy was measured. The accuracy of the Quebec model, as applied to Ontario data, was compared to that of two alternative models: 1) a model recalibrated on Ontario data and; 2) a model trained and validated using all available data (pooled Quebec-Ontario model).

**Results:** On manual review 640 (16.0%) and 303 (13.3%) reports were pneumonia-positive in Quebec and Ontario data, respectively. The SVM model predicting pneumonia on Quebec data achieved 83% sensitivity (95%CI: 78% – 88%), 98% specificity (95%CI: 97% – 99%) and 88% PPV (95%CI: 83% – 94%). When applied to Ontario data, this model achieved 57% sensitivity (95%CI: 51% – 63%), 99% specificity (95%CI: 98% – 99%) and 86% PPV (95% CI: 80% – 90%). In comparison, the model retrained on Ontario data achieved 76% sensitivity (95%CI: 70% – 82%), 98% specificity (95%CI: 97% – 99%) and 86% PPV (95%CI: 82% – 91%), while the pooled Quebec-Ontario model performed worse than the Quebec model, but better than the Ontario one.

**Conclusion:** A statistical NLP model predicting pneumonia has limited generalizability when it is directly applied to EHR data from another institution. However, good prediction performances can be achieved after model recalibration on local data.

### ISQUAI6-2069 OUR JOURNEY TOWARDS EXCELLENCE: AN ANALYSIS OF EFFORTS MADE TO ENSURE CONTINUOUS CARE BY PROVIDING MEDICAL RECORDS

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**Objectives:** Hospitals maintain stringent focus on the life and health of their patients. Excellent medical care is a result of synergy of all supportive components, be it clinical or non-clinical. Astute medical record maintenance and timely provision of the same at patient care areas are key components which promote excellent caregiving. Availability of medical records for walk-in patients (those who come without an appointment) is a limitation

being faced by the care providers, which is being tackled by the Health Information Management Services (HIMS) department of Aga Khan University Hospital. The objective of this study was to analyze the effectiveness and sustainability of measures taken to rectify the unavailability of medical records for walk-in patients and also to elicit the satisfaction level of patients and care providers.

**Methods:** Data for 2010 indicators was reviewed for records delivery of walk-in patients. Patient complaints were also scrutinized as were incident reports (formal complaints) rose by care providers. The issues uncovered were; Human error due to manual collection of file delivery record for indicators. Multiple file storage locations (5 on-campus and 1 off-campus) resulted in lack of supervision. Inadequate fuel for medical record transportation vehicles as a result of government's inability to ensure continuous fuel supply and inadequate training of newly recruited staff.

Measures taken; in 2011, strategies were formulated. Control Chart application was devised for systematic capturing of indicators. Hospital funds were allocated after the approval of proposal for a new centralized on-campus records storage location and also for recruiting contractual staff to sustain the efforts of moving all medical records to one centralized site. Weekly schedule compiled encompassing government guidelines for acquiring sufficient fuel for medical records transportation and drivers were counseled to maintain strict adherence. Timely implementation of training program for newly recruited staff.

Assessment of effectiveness & sustainability; Hourly monitoring of medical records delivery via the Control Chart application. Constant monitoring and timely response to patients' complaints and incident reports.

**Results:** As shown in the results (table 1), 2011 and 2012 were shifting years hence we did not find significant mean difference of these years when compared with 2010. However, in 2013 significant improvement was observed (total files delivered 91.1, files delivered within 60 min 72 & files delivered after 60 min 22.7). This progress was improved over time and in 2015 total files delivered were 98.8, files delivered within 60 min were 94.5 and files delivered after 60 min were 5.5 (results were statistically significant at P value of <0.0001). These measures also resulted in significant increase in patient's and health care provider's satisfaction (2010 = 172 to 2015 = 2).

**Conclusion:** Continuous performance monitoring led to provision of high quality services and optimum satisfaction levels of HIMS customers (patients and care providers).

## ISQUAI6-3178 HOSPITAL HEALTH SERVICE QUALITY AND UNIVERSAL HEALTH CARE IN INDONESIA

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**Objectives:** Full implementation by 2019 of Indonesia's *Jaminan Kesehatan Nasional* (JKN), will provide the country's 250 million people with financial coverage for comprehensive medical care. The objective of this study is to determine how the first 2.5 years since introduction has affected the quality of hospital health care and project how it will continue to do so as it is fully implemented in the coming years. The hospital accreditation process impact evaluation (HAPIE) is a 4 years study that examined the quality of services in nine classA hospitals in Indonesia beginning in 2011. It examined the changes from before implementation of JKN to after 2.5 years later.

**Methods:** Quantitative data on indicators of quality of care were collected from chart reviews for patients admitted to the hospitals for childbirth or with diagnoses of pediatric pneumonia, myocardial infarction or hip fracture. We also collected data from observations and reviews of hospital documents, regulations, and policies along with interviews with key informants from all hospitals. A questionnaire captured patients' experiences with their care during their inpatient stay. Data were analyzed to determine the difference between the pre- and post-JKN implementation period. Although the study was designed to evaluate the effect of hospital accreditation on quality of care, implementation of JKN after baseline data were collected provided an opportunity to compare the quality of care delivered before and after the universal payment system was implemented.

**Results:** Improvements were seen in about half the indicators collected but there was substantive variability between the hospitals that appeared to be associated with other factors. There was a slight decrease in indicators of positive patient experience in general. In qualitative interviews with administrators, some hospitals had difficulties receiving timely payment for health services provided with implementation of JKN and the case mix was reported to have changes, especially for uncomplicated childbirth. This was due to a change in the referral system. Key informants in hospitals reported that implementation of JKN did have implications of the quality of care delivered – some positive and some negative.

**Table 1** Number of files delivered to the requested location & Status of complaints

Year	Files delivered (%) Mean (SD)	Files delivered within 60 min (%)	Files delivered after 60 min (%)	Complaints related to file delivery		
				Patient's complaints	IRF	Total complaints
2010	65.7 (3.4)	60.1 (4.2)	39.9 (4.2)	72	100	172
2011	76.8 (3.4)	48.2 (11.2)	51.8 (11.2)	106	84	190
2012	85 (6.6)	48 (11.4)	52 (11.4)	22	16	38
2013	91.1 (1.8)	72 (19.6)	22.7 (11.6)	14	7	21
2014	96.9 (1.7)	91.2 (2)	8.8 (2)	9	5	14
2015	98.8 (0.4)	94.5 (1.1)	5.5 (1.1)	0	2	2

**Conclusion:** It appears that the first year of implementation of JKN had some positive and negative impact on the quality of care delivered or patient experience in these nine hospitals in Indonesia. The universal health care system has the potential to positively influence the quality of care delivered through its developing monopoly power. There are currently no substantive measures in place to incentivize improvements in hospital health care delivery and it remains to be seen whether one will be developed in the coming years to address poor quality care.

### ISQUAI6-2820 NARROWING THE GAP: HOSPITAL ACCREDITATION AND INEQUALITY IN SOUTH AFRICA

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**Objectives:** To identify differentials in aspects of performance (as measured by the various accreditation components) and quality, as measured by health outcomes, between the public and private sectors in South Africa. The South African health system is characterised by high levels of inequality; both in the quality of care provided and in the ability for different subsets of the population to access this care. The most notable differential is between the public and private healthcare sectors in South Africa. Private healthcare in South Africa is generally perceived to offer higher and more consistent quality of care, albeit at a price. The sector accounts for half of national health expenditure but access is limited to those who can afford private care: the 16% of the population with private cover and the minority who pay out of pocket.

Despite comparably high healthcare expenditures overall, these inequities result in relatively poor outcomes. Of particular concern are poor outcomes for maternal and child mortality. Health reforms in South Africa are aimed at reducing the extent of these inequalities, with strong emphasis on improving the quality of care in the public sector. The public sector is described as having “quality problems in the areas of staff attitudes, waiting times, cleanliness, drug stock outs, infection control and safety, and security of staff and patients”.

**Methods:** With the assistance of COHSASA (The Council for Health Services Accreditation of Southern Africa), it has been possible to compile a unique data set that includes valuable information on both public and private hospitals in South Africa. COHSASA conducts comprehensive quality accreditation surveys for hospitals across Southern Africa. This has allowed for the analysis of the two sectors according to a common yardstick. The data includes accreditation scores and situational analyses for 178 hospitals over the period 2006–2015.

The COHSASA data were linked to both census (2010) data and health outcomes data. The link to census data allows regional variations in quality of care to be explored. Of particular interest is the question of quality of care in rural and poor regions of South Africa (i.e. for the most vulnerable segments of society). By linking to outcomes data we are able to explore the relationship between accreditation scores and outcomes. This in turn allows for the differentials in accreditation scores between public and private hospitals to be meaningfully related to differentials in health outcomes.

**Results:** The polarisation between the quality of public and private facilities is evident from the accreditation data. Private facilities consistently score above public facilities across a range of accreditation categories, and there is far greater variability in the scores achieved by public facilities. The impact of the level of inequality in the provision of healthcare in South Africa, and the areas where these inequalities are most severely experienced, can be clearly seen.

**Conclusion:** This research informs policy makers where to concentrate improvement efforts. This will help inform attempts to improve access to quality healthcare in South Africa. The level of insight that a study of this nature can provide is encouraging, and can pave the road to making much needed progress in improving the currently flawed South African health system.

### ISQUAI6-3013 EVOLUTION OF THE QUALITY OF CARE: AN INVESTIGATION INTO HOSPITAL PERFORMANCE AND THE ROLE OF ACCREDITATION IN SOUTH AFRICA

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**Objectives:** The objective of this study is to investigate the relationship between healthcare facility accreditation, using internationally recognised standards, and health outcomes. We are interested in whether accreditation correctly assesses the quality of a hospital (as manifesting in health outcomes) and, further, the nature of the evolution of health outcomes (as influenced by accreditation) over time.

**Methods:** While burden of disease and demand side factors contribute to poor health outcomes, outcomes cannot be improved through improved access to health care alone. Good quality health care is needed for an improvement in health outcomes. One method that has been employed in pursuit of improved health care quality in various countries throughout the world is health service accreditation programmes.

Healthcare facility accreditation programmes provide a framework to help create and implement systems and processes (1). They increase transparency and accountability within the healthcare system. We expect that through these mechanisms accreditation

can improve hospital performance and outcomes. The hypothesis is that if the accreditation process aids hospitals to improve then hospitals should improve their accreditation score as well as their health outcomes with repeated surveys. While this is widely accepted there is, however, little empirical evidence examining this link. We investigate the relationship between accreditation and health outcomes to firstly establish the validity of the link between outcomes and accreditation. Thereafter we explore the evolution of health outcomes by using repeated surveys measuring quality through a host of health safety measures to test if quality improves with each survey. We delve into this by investigating how hospitals improve over time when considering a range of clinical elements, service areas and health outcomes. In summary, we first examine if accreditation correctly assesses the quality of a health service provider and then we test if accreditation may have an influence on this quality.

With the assistance of COHSASA (The Council for Health Services Accreditation of Southern Africa), it has been possible to compile a unique data set that includes valuable information on both public and private hospitals in South Africa. COHSASA conducts comprehensive quality accreditation surveys for hospitals across Southern Africa. This has allowed for the analysis of the two sectors according to a common yardstick. The data [1] includes accreditation scores and situational analyses for 178 hospitals (41 private, 137 public) over the period 2006–2015. We have access to a unique data set including rich information on outcomes (including perinatal mortality), management, performance, staffing, admissions, length-of-stay, case mix and capital investments. For 149 of the hospitals we have detailed repeat assessments that can be analysed to look at how hospitals evolve over time and how this evolution happens.

A range of empirical tools are used for the analysis. This includes descriptive analysis as well as multi-variate analysis techniques. To establish a profile of hospital feeder communities, we use GIS matching techniques to create socio-economic profiles with South African Census 2010 data. This allows us to control for the wealth of feeder communities.

**Results:** No results have yet been generated. Results will have been generated by the time of the conference.

**Conclusion:** Conclusions will be informed by the study results which will only have been generated by the time of the conference.

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#### ISQUAI 6-2904

### “BEYOND PROJECTS” – A SYSTEMIC APPROACH TO IMPROVING QUALITY, PATIENT-FOCUSED CARE

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**Objectives:** To develop, implement and evaluate a system-wide Challenge with the aim of improving safety and quality.

**Methods:** The Clinical Excellence Commission (New South Wales (NSW), Australia) developed a Challenge for health care services based on the available evidence about crucial organizational attributes. Work on ‘the Challenge’ was undertaken with the aim of achieving long-term systemic and organizational improvements in safety and quality in health care [1]. The 27 strategies included within the Challenge framework were drawn from studies of effective strategies used by high-performing health services [2].

In 2012, the Challenge was issued to all 15 local health districts across NSW - Australia’s most populous state, with 7.4 million residents and 1.66 million public hospital admissions per year. To gain senior executive commitment and promote sustainability, services were invited to ‘sign-up’ to The Challenge at Board level. The districts were encouraged to use ‘The Challenge’ strategies to guide local improvements in care within district health services in partnership with patients, families and carers.

**Results:** Within the first year, 13 of 15 local health districts committed to The Challenge. By 2015, 14 of 15 Districts were implementing strategies. At the outset, most districts nominated 2 or 3 strategies as initial areas of focus. A review in 2015 conducted with 14 ‘signed-up’ districts indicated an average of 22 strategies implemented with a range of 11–27. Strategies implemented included:

- New policies and practices implemented in governance and service delivery
- Increased stakeholder engagement in quality, risk management and advisory committees
- New escalation process for deteriorating patients implemented
- New approaches to staff education undertaken.

State-level outcome data includes:

- State-wide patient experience surveys
- Annual staff workforce surveys
- Patient complaints data
- Annual safety and quality culture audit

**Conclusion:** System-wide approaches to safety and quality strategies can support health services to improve patient care. Although comprehensive organization-level implementation takes longer than a ‘6 month pilot project’, this strategic approach brings about sustainable change which alters culture as well as service delivery.

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## ISQUAI6-2255 THE HOSPITAL AT NIGHT TEAM NURSING MODEL OF CARE

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**Objectives:** To evaluate the Hospital@Night Team (H@NT) nursing model of care, and to investigate nurses' perception of the model one year after implementation.

**Methods:** This project took place in a public metropolitan hospital in Victoria, Australia. A total of 14 wards with a mix of acute medical and surgical patients were involved. The H@NT nursing model of care focused on improving the nursing work environment after hours and provide timely quality care for patients after hours. The H@NT was implemented in October 2013 and evaluated a year after implementation. Baseline data from the risk management system and a staff satisfaction survey were collected. Descriptive statistics were used to examine the pre-and post data collected. Four focus groups were conducted with a total of 34 nurses. The focus groups were conducted by two researchers not directly involved in the hospital to safeguard the anonymity of the participants. The recorded and transcribed interviews were analysed using thematic analysis.

**Results:** The workload for the H@NT has increased from pre implementation (January-June 2013) 1,548 tasks logged to post implementation (November-April 2015) 27,974 tasks logged (per 1,000 bed days) for the 14 wards. The number of falls (between 09:00 pm. and 07:00 am.) decreased for medical, surgical and specialty wards from 33 (January-June 2013) to 29 (November-April 2015) per 1,000 bed days. The number of cardiac arrests decreased (March-August 2013) 2.2 per 1,000 bed days, Post 1 (March-August 2014) 2.2 to Post 2 (March – August 2015) 0.5 per 1,000 bed days. Four main themes were identified in the focus groups; changing role perceptions by nurses as the H@NT was embedded into the organisation; the impact of technology on workflow and responsiveness; adaption and refinement of an evolving service with feedback and evaluation; and facilitation of collaboration and learning across disciplines.

**Conclusion:** Implementing a new model of care and promoting changes in the workflow requires good communication, and strong collaboration among the stakeholders. The workload for the H@NT increased, and some of the measured patient outcomes such as number of falls and number of cardiac arrests decreased. This process identified potential barriers and enablers, however, overall the H@NT model of care provides support, collaboration and shared learning across the organisation. The staff survey results show an increased satisfaction with the support and collaboration after the H@NT nursing model of care was implemented.

## ISQUAI6-3135 MEASURING PATIENT SAFETY USING CLINICAL REGISTRIES – OPPORTUNITIES AND AREAS FOR IMPROVEMENT

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**Objectives:** To illustrate if and how Clinical Registries can meet a demand for measuring patient safety – and evaluate patient safety initiatives

**Methods:** Reporting from the 65 Danish clinical registries has been systematically evaluated to answer the following questions:

1. Is patient safety dimensions monitored via the registries?
  1. If yes, then via indicators covering results of care? Or processes of care?
2. Have the results been audited?
  1. i.e. have the data quality been evaluated?
  2. i.e. used to evaluate different safety levels across time/hospitals?
  3. i.e. have the results been used to identify the need for improvement in quality of care?
3. Have the auditing lead to changes in the provided care/improvement over time?

**Background:** The 70 Danish clinical registries cover a wide range of different areas both in acute and chronic care - mostly hospital care. In this evaluation only registries having published at least two reports have been included.

The Danish registries serve an important role in the Danish quality strategy. Due to the increasing importance of patient safety a new framework for developing the Danish registries have created a need for a general implementation of indicators measuring adverse events, complications, and risk.

Measuring patient safety using indicators has proven difficult partly due to difficulties ensuring clinical relevance of indicators and partly due to low data quality.

**Results:** The examination has shown the following:

1. 26 out of the 65 registries having published 2+ reports monitor patient safety dimensions via indicators
2. There are a total of 44 indicators in the 26 registries:
  - 33 outcome indicators - 28 covering complications due to invasive interventions; 5 covering medical interventions and obstetrics
  - 11 process indicators i.e. risk screening, diagnostic error, preoperative prophylaxis
3. Auditing
  - In 21 of 26 registries the data quality have been assessed
  - In 16 of the 26 registries variation have been evaluated
  - 11 of 26 registries either provide recommendations for changes in care or conclude no changes are needed

**Conclusion:** Patient safety is important. But how do you ensure you're working efficiently with patient safety? And how do you evaluate your patient safety initiatives?

An evaluation of the Danish clinical registries show that registries can be used to monitor patient safety; to evaluate the effect of patient safety initiatives and to identify need for initiatives.

This because registries:

- Have a great deal of clinical ownership
- Cover a great segment of provided care
- Are used to working systemically with quantifiable data and data quality

However certain requirements need to be met for the full potential of the clinical registries in this area to be realised:

- Indicators covering other areas than surgical safety need to be developed and implemented (e.g. medication safety)
- Introduction of a new approach to auditing patient safety data is needed (e.g. root cause analysis)
- Clinical experts rooted in evidence-based medicine have to develop competences in patient safety

### ISQUAI6-2464

#### HOW PATIENTS-AS-PARTNERS CAN HELP INCREASE PATIENT SAFETY AT THE BEDSIDE

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**Objectives:** To advocate for patients, particularly those with chronic illness, to be more actively involved with the healthcare services they receive, the Faculty of Medicine of the University of Montreal (UM) in Canada and its affiliated hospitals developed the Patients as Partners concept, where the patient is considered a full-fledged partner of the healthcare delivery team and the patient's experiential knowledge is recognized. This study aims to illustrate how patients interact with their healthcare professionals to reduce patient safety incidents.

**Methods:** Using theoretical sampling, we conducted 18 semi-structured interviews with patients who train health sciences students at UM on the concept of patients as partners. For this study, participants had to have participated in at least one interprofessional collaboration course at UM in the previous year and completed a training course on the concepts of partnership of care. Since participants were selected based on their familiarity with the concepts, they were able to talk about them with respect to their own experience of care. The interviews were semi-structured and covered: 1) whether they had been through an incident or accident, or had avoided either one, in connection with their treatment or that of a close one; 2) how they had applied the patient-as-partner concept in such situations; 3) how the team had reacted; 4) how partnership of care can help minimize incidents and accidents in the healthcare system.

**Results:** Out of 18 patients, 15 reported having faced an accident during their treatment and 13 had avoided one. These accidents and incidents related to diagnostic errors (n = 3), secondary effects of medication (n = 6), potentially hazardous clinical conditions for beginning treatment (n = 4), nosocomial infections (n = 4), loss or

oversight of diagnostic (n = 2) or biomonitoring (n = 6) results, and medical devices (n = 2). Patients were able to avoid incidents not only thanks to being alert and knowledgeable regarding their illness, their treatment, and the secondary effects linked to treatment, but also due to the experiential knowledge from their own experience or that of someone close. All were impressed at having had the courage to intervene. It cost them a lot of energy and gave them the sense of going against a prohibition by questioning the decisions of health professionals. Those who had faced an accident often had difficulty declaring it, partly due to fearing reprisal, partly because it had not occurred to them. In the majority of cases, the teams at first had trouble accepting the patients' interventions and only later came to appreciate the added value of their participation. All patients concluded that their knowledge of partnership of care and services had helped them be more involved in their own care, which led them to be gradually more proactive and more vigilant in preventing incidents and accidents.

**Conclusion:** The concept of patient as partner is key to patients' capacity to become actors involved in their own care, enabling them to see situations that professionals themselves cannot see or anticipate, for example due to their lack of an overall perspective on care episodes or on the patient's clinical history. It is therefore important for patients to be trained as partners and for care teams to recognize their clinical and experiential knowledge. This recognition and collaboration will help make care establishments safer.

### ISQUAI6-1646

#### HOW TO ACHIEVE SAFETY EXCELLENCE ON ELDERLY MEDICAL WARDS: A POSITIVE DEVIANCE APPROACH

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**Objectives:** Within healthcare, the limited success of deficit based approaches in improving patient safety has led to an increasing focus on 'how things go right most of the time'. Positive deviance, an asset based approach, learns from those who demonstrate exceptional performance despite facing similar constraints as others. This study applies the positive deviance approach to generate hypotheses about the abstract behaviours and concrete strategies that staff on positively deviant elderly medical wards use to deliver exceptionally safe patient care.

**Methods:** A qualitative study was conducted on eight elderly medical wards within five NHS Trusts in the North of England. Wards were selected using a routinely collected outcome measure of overall safety; four wards were positively deviant (exceptional safety performances), and four wards were matched comparators (slightly above average safety performances). Semi structured, multi-disciplinary

staff focus groups explored how safe patient care is delivered at ward level. The researcher made field notes following each focus group. Data from all wards were analysed thematically to create a framework of abstract behaviours and concrete strategies that facilitate high performance in general. This was then analysed to identify differences between positively deviant and comparison wards which enabled hypotheses to be generated about which behaviours and strategies were specifically related to positive deviance.

**Results:** The thematic framework of factors influencing general high performance included five high-order observations, 12 themes, and 65 subthemes (all of which pertained to abstract behaviours), and 14 concrete strategies. This presentation will focus on the behavioural sub-themes that were specifically hypothesised to facilitate ward level positive deviance. Positively deviant behaviours related to staff relationships, integrated multidisciplinary ward teams, performance improvement efforts, and communication among team members. The concrete strategies that staff use to achieve these abstract behaviours will be highlighted. For example, holding daily 'safety briefings' or 'board rounds' that are timely and involve all staff regardless of their grade, emphasises the important role everyone plays in maintaining safety, engenders a multidisciplinary approach, and facilitates relationships by enabling staff to get to know one another and by reducing work related frustrations.

**Conclusion:** This research reports the first known application of the positive deviance approach within the UK's National Health Service. Findings highlight the positively deviant behaviours that are hypothesised to facilitate not only good but exceptionally safe patient care at ward level. Furthermore, the specific, concrete, and practical strategies that staff use to achieve these more abstract positively deviant behaviours are identified. Testing and spreading these to similar elderly medical wards may generate improvements in patient safety.

## ISQUAI6-3062 IMPROVEMENTS IDENTIFIED, BUT FUTURE SUSTAINABILITY IS NOT ASSURED: STAKEHOLDERS' VIEWS ON ACCREDITATION IN AUSTRALIAN GENERAL PRACTICES

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**Objectives:** The Royal Australian College of General Practitioners' (RACGP) Standards (*The Standards*) for general practices provide a template for quality care and risk management [1]. Accreditation of general practices against *The Standards* establishes a process to promote the delivery of safe and high quality care in this setting. The objective of this study was to investigate stakeholders' attitudes to accreditation in general practice.

**Methods:** This study employed group (n = 9) and individual (n = 2) interviews between September 2011-March 2012. Participants (N = 52) were stakeholders involved in the accreditation process including representatives from: Australian General Practice Accreditation Limited (AGPAL) accreditation program

members (n = 8), accreditation surveyors/assessors (n = 10), and management team (n = 7); Australian General Practice Network (n = 1); Australian Practice Nurses' Association (n = 10); Australian Medical Association (n = 2); and, RACGP (n = 14). Interview questions explored the: aims; consequences; strengths; and limitations of the accreditation program. Interviews, digitally recorded and transcribed, were coded in light of the study objective. Identification of emerging themes was an iterative and consultative process between research team members.

**Results:** There was a shared view of the importance of the accreditation program in improving quality and safety in general practice. Nevertheless, divergent views, both positive and negative, were identified. Accreditation was attributed with improving quality and safety, particularly in relation to practice structures and processes, e.g. vaccine fridges, documentation, and sterilisation techniques. Identified strengths of the program included program ownership, peer review and collaborative learning that facilitated quality improvement. Accreditation also supported quality improvement initiatives by providing access to related funding incentives. However, it was considered to be time consuming and resource intensive and some participants perceived a diminishing return on the time and resources invested with ongoing accreditation cycles. Negative experiences with uncompromising surveyors who inflexibly applied the standards without consideration for context were considered limitations of the program. Other limitations included: difficulty isolating the impact of accreditation from that of other factors such as concurrent quality improvement activities; and patient choices, e.g. visiting other primary care providers or non-compliance with treatment. Additionally, a lack of evidence for the impact of accreditation, specific to the sector, was considered problematic.

**Conclusion:** Stakeholder groups acknowledged the organisational benefits and process improvements that could be derived from the accreditation program; quality and safety in general practice was considered to have risen over time. However, the sector, having gained improvements from several accreditation cycles, now faces the challenge of dealing with the limitations of the program. The negative factors reported, covering program implementation issues and a requirement for clearer outcome measures, are ripe for addressing. This will be important if the continued or extended engagement of practices with the program is to be assured.

### References

1. The Royal Australian College of General Practitioners. *Standards for general practices*, 4th ed. Melbourne: The Royal Australian College of General Practitioners, 2010 (updated 2013): 160.

## ISQUAI6-1278 THE DIFFERENCES OF STRENGTHS BETWEEN SUBGROUPS OF ACUTE CARE HOSPITALS IN ACCREDITATION SURVEY RESULT IN JAPAN

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**Objectives:** Japan Council for Quality Health Care (JQ) is a third-party organization conducting hospital accreditation in Japan based on their accreditation scheme. It has 6 accreditation standards based on hospital type, and two of them are for acute care hospitals. One is hospital type 1 referring small- to mid-sized hospitals (smaller hospitals) and the other is hospital type 2: core hospitals supporting local healthcare in a relatively broad area (larger hospitals). The evaluation is made to each Small Item using 4 levels, which are “S (excellent)”, “A (applicable)”, “B (achievement of a certain level)” and “C (non-achievement of a certain level)”, and Small Items are categorized into 16 Large Items (LI). The purpose of this study is to review the strength of smaller hospitals and larger hospitals by comparing the accreditation survey result.

**Methods:** The 134 hospitals surveyed based on smaller hospitals and the 233 hospitals surveyed based on larger hospitals in FY 2014 were selected. A distribution of the result (S, A, B, C) of each item was calculated. The three items which had the largest and the smallest differences of percentages of hospitals getting rate “S” or “A” between smaller hospitals and larger hospitals were selected and the item contents were reviewed. The chi-square test was used to determine whether the differences are statistically significant.

**Results:** The three items which had the largest (No. 1-3) and the smallest (No. 4-6) differences of percentages of hospitals getting rate “S” or “A” between smaller hospitals and larger hospitals are follows.

No	Item #	Contents	Smaller hospitals	Larger hospitals	X <sup>2</sup>
1	4.1.4	Policies regarding information management are clarified for effective use of information.	53.0%	89.7%	**
2	4.1.3	Effective and systematic organizational administration is conducted.	45.5%	75.5%	**
3	1.5.2	Activities are performed for improvement of quality in healthcare.	26.9%	56.7%	**
4	2.2.15/ 2.2.13	Management of severely ill patients is performed properly.	97.2%	98.3%	n.s.
5	2.1.6	Preventive measures for falls are taken.	92.5%	94.0%	n.s.
6	2.2.2	Outpatient treatment is given properly.	93.8%	95.3%	n.s.

\*\*p<0.01

n.s.: Non-significant

4.1.4 and 4.1.3 are categorized as “LI 4.1: Administration of hospital organization and leadership of administrators/executives”. 1.5.2 is categorized as “LI 1.5 Measures for continuous quality improvement”. 2.2.15, 2.2.13, 2.2.2 are categorized as “LI 2.2 Implementation of medical treatment/care through a team approach”. 2.1.6 is categorized as “LI 2.1 Quality and safety assurance in medical treatment/care”.

In the items that the percentage of hospitals getting rate “S” or “A” is higher in smaller hospitals than larger hospitals, there were none that differences were statistically significant.

**Conclusion:** There were both items which had large and small variations between smaller hospitals and larger hospitals regarding the percentage of hospitals getting rate “S” or “A”. Larger hospitals tended to get high score especially in “LI 4.1 Administration of hospital organization and leadership of administrators/executives”. That means larger hospitals have strength in organizational administration. Over 90% of hospitals in both types getting “S” or “A” in “LI 2.2 Implementation of medical treatment/care through a team

approach” means most of the acute care hospitals in Japan have strength in this area.

In addition, considering the significant differences of hospitals getting “S” or “A” between larger hospitals and smaller hospitals, smaller hospitals having lower score tended not to achieve a certain level and would be able to get larger benefit by having hospital accreditation to improve quality in healthcare.

## References

Hospital Accreditation Standards 3rdG: Ver1.0>.

## ISQUAI6-2335

### PATIENT SAFETY’S MISSING LINK: USING CLINICAL EXPERTISE TO RECOGNIZE, RESPOND TO AND REDUCE RISKS AT A POPULATION LEVEL

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**Objectives:** Although incident reporting systems are widespread in health care as a strategy to reduce harm to patients, the focus has been on reporting incidents rather than responding to them. Systems containing large numbers of incidents are uniquely placed to raise awareness of, and then characterize and respond to infrequent, but significant risks.

Our objective is to outline a framework for the surveillance of such risks, their systematic analysis, and for the development and dissemination of population-based preventive and corrective strategies using clinical and human factors expertise.

**Methods:** The framework comprises system and personnel requirements and a risk surveillance, review and response process.

There are four system requirements:

- a means for reporting incidents that is available to all health care workers and is non-punitive, independent and confidential;
- software to aggregate incidents from multiple sources and institutions.
- a system for the production and management of reports for each stage of the risk surveillance, review and response process; and
- a system to disseminate corrective strategies to health care organizations.

Personnel requirements include a non-hierarchical multidisciplinary team comprising clinicians and subject-matter and human factors experts to provide interpretation and high-level judgement from a range of perspectives. The clinicians’ understanding of typical health care organizations’ workflows play an important role in their ability to interpret incidents. Subject-matter experts assist in understanding the patterns of contributing factors. Human factors

personnel can advise on common error mechanisms and the development of corrective strategies which are 'strong' and sustainable.

The nine-stage risk surveillance, review and response process includes searching of large incident and other databases for how and why things have gone wrong, narrative analysis by clinical experts, consultation with the health care sector, and development and pilot testing of corrective strategies. Criteria for deciding which incidents require a population-level response are outlined.

**Results:** The aim is to disseminate preventive strategies which are proportionate, achievable, cost-effective and acceptable to the clinical community and recipients of health care. Such a function is designed to complement the functions of local incident reporting which are fundamental components of clinical governance by providing mechanisms for a local response as part of a 'duty of care'.

Although seldom straight forward, evaluation can determine the effectiveness of population-level response functions including risk prioritization and characterization and corrective strategy dissemination and implementation. Data sources and methods will depend on the strategies being evaluated and could include clinical process audits, equipment and medicines procurement record audits, and surveys or interviews of clinical and administrative managers responsible for actioning the recommendations.

**Conclusion:** A small, skilled clinically led response team using a structured review process, representing a marginal additional resource, can improve efficiency by developing corrective strategies just once at a population level. The incremental cost of a population-based response function is modest compared with the 'reporting' element.

#### References

Hibbert P, Healey F, Lamont T, Marela W, Warner B, Runciman W. Patient safety's missing link: using clinical expertise to recognize, respond to and reduce risks at a population level. *IJQHC* 2015;pii: mzv091.

#### ISQUAI6-2674

### THE ACCREDITATION CANADA PROGRAM: FACILITATING INTEGRATION ACROSS A HEALTH SYSTEM AND THE CONTINUUM OF CARE

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**Objectives:** This presentation showcases how accreditation can be used as a catalyst to facilitate the integration of quality improvement efforts across an entire province-wide health authority and across the continuum of care.

**Methods:** In the fall of 2014, legislation created two health authorities in the Canadian province of Nova Scotia. Effective April 2015, nine health authorities were amalgamated under one governing body. While the second health authority, the Izaak Walton

Killam Health Centre, retained its governance structure, the formation of an integrated health authority created the need for a new approach to accreditation in the province for the newly-created entity, the Nova Scotia Health Authority (NSHA).

**Results:** In order to ensure a consolidated approach to quality and safety and to obtain a common baseline, the overall NSHA 2017 on-site survey has been designed to inform three key question lines:

1. Are there areas of the province which use best practice that can be spread across the whole NSHA? Are there areas needing to form quality teams which span geographic areas, thereby encouraging integration?
2. Where is the variability in relation to compliance with the Accreditation Canada Required Organizational Practices (ROPs)? ROPs are evidence-informed practices that mitigate risk and contribute to improving the quality and safety of health services. Compliance with the ROPs is rated onsite by peer surveyors and constitutes a central component of the on-site survey.
3. Are there similar practices being used to achieve compliance, and can consistency enhance quality? Can areas having divergence of practice and policy be identified to move towards enhanced integration? Are there learnings from the accreditation process which would promote the "NSHA wide best practice but locally delivered" philosophy?

Interim bridging on-site surveys in 2016 for the former health authorities are being used to ensure that standards for high risk areas such as Infection Prevention and Control and Medication Management are maintained. Self-assessments and organizational questionnaires on patient safety culture and worklife are also being deployed in 2016 to provide a comprehensive gap analysis and to inform an action plan for integrated quality improvement.

**Conclusion:** The collaborative process and model developed by Accreditation Canada and NSHA have implications for the customization of an accreditation process to achieve integration, both nationally and internationally. Accreditation Canada and NSHA collaborated to develop a model to meet the accreditation objectives of the province-wide health authority, consolidate quality improvement efforts across the province, and mitigate risks arising prior to the next planned on-site survey.

Accreditation can thus be used to facilitate integration of quality, safety and performance both at the leadership and service levels. The results of the Accreditation Canada on-site survey will assist NSHA to prioritize areas for improvement through the increased use of evidence and data to inform planning, learning and service delivery. "We see accreditation as another beneficial way to shine the light on what we can share for province-wide improvement and where we collectively need to put our efforts." (C. Gaulton, Vice-President, Quality and System Performance, NSHA). Accreditation Canada and NSHA have collaborated to develop a model meeting the accreditation objectives of the province-wide health authority, consolidating quality improvement efforts across the province, and mitigating risk prior to the next planned on-site survey.

**ISQUAI6-2589**  
**FRENCH ON-LINE INITIATIVE TO MEASURE**  
**PATIENT'S EXPERIENCE FOR IMPROVEMENT OF**  
**THE QUALITY OF CARE**

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**Objectives:** To integrate Patient-Reported outcome measures (PROMs) as a strategy for transforming practices and improving quality of care as well as informing users.

**Methods:** In 2015, the French National Authority for Health (HAS) with the collaboration of experts' committee has developed a system, called e-Satis, with:

- A standardized on-line 64 items questionnaire based on academic and scientific approaches. Scales were classically developed following the Churchill paradigm (1979). Reliability was tested using Cronbach's Alpha and Joreskhög's Rho. We tested convergent and discriminant validity using Confirmatory Factor Analysis. All psychometric properties reached usual thresholds;
- A global validated PROM for each hospital, for each region and at a national level;
- A secured on-line data collection procedure on a continuing basis;
- An e-learning program dedicated to promoting the appropriate use of patient related outcome indicators at local, regional and national levels.

**Results:** e-Satis has been operational since September 2015. The key stakeholders' commitment (experience experts, health professionals, users, hospitals' federations, governmental institutions...) has facilitated the implementation of a trustworthy system to produce quality indicators in order to benchmark hospitals and to support quality improvement.

The issues of the statistical analysis are:

- Six specific dimensions of perceived quality of care (hospital entrance, patients care split into two categories: doctor care and nurse care, accommodation, meals, hospital discharge);
- A global validated PROMs integrating these 6 dimensions;
- Detailed results according to the type of patient experience (simple or complex).

The issues of the data collection (2 months after launching) are:

- 60% of the 1,525 acute care hospitals has taken part in the patient' e-mails collection based on the HAS requirements. In order to gather data, 24% needed specific SI development;
- 2, 7% of the 1, 1 Mio acute care inpatients during this period had provided on-line answers to the questionnaire. The response rate is currently rapidly increasing up to 5%.

By October 2016, results will be available to discuss.

**Conclusion:** Acute care hospitals have been engaged on the on-line e-Satis. To develop action plans, hospitals teams will benefit of:

- Several indicators on specific aspect of quality of care as well as verbatim of patients comments for hospital professionals and users;
- Detailed results to focus on items related with patient experience (11) and with patient satisfaction (38) according to the nature of experience (simple or complex).

A national program is currently developed to help them to integrate these data in the quality improvement process.

The integration of PROM is already promoted by accreditation program.

Finally, the national regulation system also uses e-Satis results with reliable comparison between hospitals for public reporting and financial incentives.

Three perspectives:

- To implement the system on other activities as ambulatory care, emergency department...;
- To promote the well understanding and efficient use of patient experience data to improve quality of patients care;
- To define specific PROMs available for several clinical conditions.

**ISQUAI6-2483**  
**RANDOMIZED TRIAL OF A PERSONALIZED MULTI-**  
**CONDITION RISK ASSESSMENT IN PRIMARY CARE**

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**Objectives:** Personalized risk assessment for chronic disease is an important component of clinical practice but is complicated by the need to evaluate multiple conditions. This randomized trial evaluated whether systematic collection of risk factors to generate a personalized health risk appraisal (HRA) for coronary heart disease, diabetes, breast and colorectal cancer was associated with improved patient-provider communication about disease risk, greater accuracy of patient self-perceived risk, and use of cancer screening.

**Methods:** Pragmatic trial of English- and Spanish-speaking adults aged 30–75 years, recruited 2013–2014, with an upcoming, comprehensive visit at 11 primary care practices in the greater-Boston area (n = 3,703). Pre-visit, intervention patients completed an assessment of their family health history, lifestyle, and risk perception for conditions of interest and then received by mail or email a 1-page HRA to discuss with their doctor, including personalized information on risk reduction and screening. Coded data on risk factors were sent to the electronic health record (EHR) for provider review and use. Post-visit, intervention patients were asked to again report their risk perception. The same information was collected for the control arm but in the opposite order, and no data were sent to the EHR. Control patients received a personalized HRA by mail or email following the post-visit assessment. Patients could complete assessments by phone using automated interactive voice response calls or via a patient-facing, web-based EHR portal. Outcomes included: patient-provider communication about disease

risk, accuracy of patient self-perceived risk, and use of cancer screening. Participants' characteristics by group were compared using two-sample t-tests, Wilcoxon tests, and chi-square tests.

**Results:** Intervention patients were more likely to report discussion of their risk with their primary care provider (adjusted odds ratio 1.34; 95% confidence interval 1.05–1.71) and changes to improve their health (1.67; 1.19–2.33). The intervention was associated with greater improvement in the accuracy of self-perceived risk. EHR data showed that women age 40–75 years in the intervention arm who had not had a mammogram were more likely to receive care more consistent with the US Preventive Services Task Force guidelines.

**Conclusion:** Systematic collection of risk factors directly from patients and use of multi-condition HRAs in primary care have the potential to improve communication, promote risk assessment, and enhance evidence-based prevention.

### ISQUAI6-1136 IMPROVING ACCESS AND OUTCOMES IN COMMUNITY PSYCHOLOGICAL THERAPIES

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**Objectives:** The prevalence of common mental disorders (CMDs), including anxiety and depression, in the general working age population in England is estimated as 16.2%. There are effective treatments for CMDs. In 2007 the UK government announced a large-scale health initiative for improving access to psychological therapies (IAPT). NIHR Collaboration for Leadership in Applied Health Research and Care Northwest London worked with an IAPT service, using quality improvement (QI) methods and media campaigns to increase referrals from areas of deprivation, and asks whether the service, supported by improvement science, provided quality care.

**Methods:** Geospatial and temporal analyses (ANOVA and Statistical Process Control) of observational data taken during normal provision of care assessed the impact on improving access to the service and assess outcome, by Patient Health Questionnaire (PHQ)-9 score [1,2]. Broadening the dataset to an additional service, discriminant analysis was conducted to identify patient and treatment factors predictive of clinical outcomes [3]. Current work uses the largest naturalistic mental health intervention dataset worldwide?, a systematic literature review and statistical modelling to establish a new recovery metric and predict improvement.

**Results:** Average weekly referrals rose from 17 to 43 during the QI phase. Geospatial analysis demonstrated that people from areas of high deprivation had increased referral during and following the QI interventions [1]. Outcome analysis showed that patients from areas of high deprivation entered the service with more severe depression (PHQ-9: M= 15.47, SD = 6.75) compared to patients from areas of low (M = 13.20, SD = 6.75) and medium (M = 14.44, SD = 6.64) deprivation [2]. Improvements in the depression score ( $\Delta$ PHQ9) showed no evidence of difference regardless of socio-economic status (M = -6.60, SD = 6.41) [2]. Predictive models assigned a positive or negative clinical outcome

to each patient, with accuracy 69.4% and 79.3% respectively, using five independent pre-treatment variables: initial severity of anxiety and depression, ethnicity, deprivation and gender [3]. The numbers of sessions attended or missed were also important factors [3].

**Conclusion:** This abstract discusses the effect of a QI initiative on access and outcome for community mental health. The results demonstrate improved access to mental health services for those from deprived areas, and found no evidence of clinical outcome differences. Identifying factors such as severity of CMD and ethnicity allows practitioners to modify delivery of services to better meet population needs, and in turn may improve outcomes. Despite demographic and service delivery differences, all services measure their success using a strict metric for 'caseness' (whether a PHQ9 score exceeds a threshold value) as indicative of a 'recovery rate'; this does not control for the severity of the individual case at the point of referral. We argue that using a measure that accounts for baseline severity at point of referral provide a fairer measure. Anxiety and depression are linked to social deprivation and improving those, also improves the deprivation scores.

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### ISQUAI6-1444 DEVELOPING A PATIENT-LED ELECTRONIC FEEDBACK SYSTEM FOR QUALITY AND SAFETY WITHIN AN EXISTING ELECTRONIC HEALTH RECORD

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**Objectives:** Explore the feasibility of renal patients, healthcare professionals and researchers working in partnership to develop a patient-led quality and safety feedback system within an existing electronic health record (EHR), known as Renal Patient View (RPV).

Adapt RPV to accommodate a patient-led quality and safety feedback system and collect a range of qualitative data from patients and staff to establish the main components of the prototype and assess usability.

**Methods:** This study was informed by Catwell and Sheikh's model designed to evaluate eHealth interventions. Renal patients, healthcare professionals and researchers acted as co-creators, and co-evaluators. Phase 1 (inception) focus groups and phase 2 (requirements) cognitive walkthroughs and 1:1 qualitative interviews involved both patients and healthcare professionals. Heuristic evaluation guided the process of evaluating how the prototype was used. A patient led-

steering group was formed, consisting of renal patients, healthcare professionals and the research team to oversee the research process. A Joint Services Expert Panel (JSP) was convened, consisting of patients, a carer, front line staff, the research team and governance leads. The purpose of the JSP was to review the findings from phase 1 and agree on the key components of the system prototype.

Focus groups were analysed using a thematic approach. Members of the research team met to compare their individual analyses and to agree a coding framework. Findings were discussed with the patient-led steering group and agreed at the JSP. Data from phase 2 were analysed using the components of heuristic evaluation, resulting in a list of key components for the system prototype.

**Results:** In phase 1, nine focus groups with 57 participants were conducted, including a non-English speaking patient focus group. Barriers and facilitators to patients feeding back on quality and safety concerns were identified:

1. **Anonymity:** patients wanted an anonymous feedback system, but healthcare professionals were concerned that this would limit their ability to investigate concerns.
2. **Inclusion of a feedback mechanism for patients:** patients expressed their desire to receive individual feedback from staff. Healthcare professionals were concerned that this would be too burdensome.
3. **Avoidance of the word “reporting” and using “feedback” instead:** participants felt that the system should be about *sharing* information between patients and staff, and avoid the use of the word reporting.
4. **Importance of being able to feedback positive experiences as well as concerns.**

In phase 2, 34 cognitive walkthroughs and interviews were completed with patients, carers, healthcare professionals and other staff members. The fourteen members of the JSP agreed on seven key principles for the system prototype: the title of the system, the inclusion of forms for both positive experiences and concerns, the need for anonymity, the use of two-tier filtering system for dealing with patient feedback, individual feedback acknowledgment, the use of unstructured feedback forms and the inclusion of a severity score.

**Conclusion:** All stakeholders were able to work together to identify key components for an electronic patient quality and safety feedback system in renal services. Tensions arose due to competing priorities, particularly around anonymity and feedback. Careful consideration should be given to the feasibility of integrating a new component with differing priorities into an established system with existing functions and objectives.

## ISQUAI6-1897

### DOCUMENTATION OF PATIENT COMMUNICATION IN HOSPITAL MEDICAL RECORDS: A PROTECTION OR A THREAT TO PATIENT SAFETY FOR ADULTS WITH COMMUNICATION DISABILITY

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**Objectives:** The aim of this research was to investigate (a) how ‘communication’ appeared in hospital medical record forms prompted staff to enter patient information, and (b) how ‘communication’ appeared in the medical records of patients with communication disability who had experienced an adverse event in hospital. These two data sources were examined for ways in which the medical record form prompted for communication, and how hospital staff had documented the patients’ communication in medical records. Results will inform the design of electronic medical records to more adequately capture the patient’s communication diagnoses, impairments, and functions to improve the care and safety of adults with communication disability in hospital.

**Methods:** This study involved retrieving 24 unique medical record forms from two metropolitan hospitals on the basis of the medical record forms being used at admission, during hospitalisation, or discharge. In addition, the medical records of nine patients with communication disability who had experienced an adverse event in hospital were retrieved and examined for ways in which staff had documented the patients’ communication diagnoses, impairments, or functions from admission through to hospital discharge. Two raters extracted data from both medical record forms and from patient medical records and differences of opinion on coding were resolved by consensus.

**Results:** The results of this study will be presented both quantitatively and qualitatively, with consideration for design aspects of the medical record forms (e.g., placement of fields relating to communication in relation to other fields, sizes of fields and space dedicated to descriptions), and for ‘function’ (e.g., ways that staff documented communication in the medical record). Major themes in the socio-technical analysis were that (a) medical record forms were not similar in prompting of communication diagnoses, impairments, functions, needs, or methods, and this may lead to missing or inaccurate data being recorded, and differences in the information recorded across forms; (b) hospital staff did not accurately document communication diagnoses; did not note communicative function (i.e., ways that the patient communicates); and did not complete or only partially completed the information on communication that was prompted by the medical record form. The results of this study will be discussed in relation to potential improvements in the design of medical record forms, developments in electronic health records, and the use of personally controlled electronic health records for recording information about communication disability.

**Conclusion:** Hospital medical record forms lack consistency in the information prompted of staff in relation to the patient’s communication diagnoses, functions, or skills. Hospital staff often do not complete medical record form items relating to patient communication. The variation in information prompted and recorded across medical record forms and in the medical records of patients with communication disability is cause for concern, given that these patients have a three-fold increased risk for patient safety incidents in hospital, and the accurate documentation of patient communication is vital. As well as noting communication diagnostic terms consistently across medical record forms, hospital staff need to verify the information

noted with the patient and family member, and to include information relating to communication functions and needs, to improve hospital care and safety for patients with communication disability.

### ISQUA16-1576 CARE PATHWAYS' ASSESSMENT FOR IMPROVEMENT: THE FRENCH EXPERIENCE ON MYOCARDIAL INFARCTION WITH ST ELEVATION (STEMI)

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**Objectives:** Assessing and improving care pathways quality is a challenge today. Since 2013 in-hospital Quality and Safety indicators on myocardial infarction with ST elevation (STEMI) are being implemented by the French national authority for health (HAS).

**Methods:** Data collected in 2013 and 2015 on STEMI < 12 hours were used to assess the care pathways “from 1<sup>st</sup> symptoms to reperfusion”.

Retrospective analysis of 16,754 in-hospital STEMI patients was performed. Inclusion criteria were: records of STEMI patients coming in within 12 hours discharged alive, with available information on direct referral to cardiology interventional centre and reperfusion therapy by primary angioplasty (PCI), by thrombolysis (TL), and reperfusion performed within the recommended delays defined as TL within 30 minutes and PCI within 2 hours of the first medical contact. Exclusion criteria were: in-hospital cases, fatal cases, end of life patients, patients refusing the use of their data, records with missing or aberrant data.

#### Results:

##### Table

Assessed criteria	2013	2015
STEMI patients (n)	8 188	8 566
Women (%)	25	25
Age (years)	63	63
>75 years	26	21
Smokers	39.6	45
Heart failure	18	18.6
Patients with direct referral to cardiology interventional centre as recommended	47	67*
Rate of reperfusion by PCI	86	89*
Rate of reperfusion by TL	14	11*
Rate of reperfusion within the recommended delays	57	71*

\*p < 0.0001

**Conclusion:** Compared to 2013, results in 2015 were significantly better in terms of rate of direct referral to cardiology interventional centre and reperfusion rate by PCI, and reperfusion within the recommended delays.

This study allows to conclude that (i) STEMI care pathway assessment is a person centered care approach (ii) its evaluation based on hospital patient records show significant improvement between 2013 and 2015 (iii) access to the recommended care

pathway should be optimised, as it is the one ensuring optimal reperfusion rates and delays, and thus better outcomes for the patients (iiii) Care pathway assessment should integrate patient experience, costs, and cover the ambulatory follow-up.

### ISQUA16-2502 ISRAEL'S ELDERLY POPULATION: DO THEY RECEIVE HIGH QUALITY CARE?

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**Objectives:** In developing countries, elderly populations are growing exponentially; those aged 65 years or older are expected to comprise 14% of the Israeli population by 2030 and other countries expect larger proportions. This study aims to evaluate the quality of primary care provided to elderly Israelis and identify those who receive low quality care so as to enable planning interventions targeted to specific subgroups.

**Methods:** Five elderly-specific (65 years and older) indicators which originated within the framework of the Israel National Program for Quality Indicators in Community Healthcare (QICH) were selected: influenza and pneumococcal vaccination, body weight documentation, and benzodiazepine and long-acting benzodiazepine use. QICH comprises data from patient's electronic medical records provided by the four Israeli health plans. Data were collected anonymously from practically all Israelis aged 65 years and older (817,575 individuals in 2013). Data were stratified by year, gender, age, and socio-economic position (SEP). Low SEP is defined as exemption from co-payments for medical services.

**Results:** Influenza vaccination rates increased since the first measurement (2002) from 42.0% to 62.2% (2013). In 2013, those in the 65–74 year age group had the lowest rate of vaccination (58.4%); women aged 65–74 years old had lower rates than men of the same age group (57.0% vs. 60.1%). Rate of pneumococcal vaccination increased since the first measurement (2005) from 25.9% to 74.9% (2013). Females were vaccinated at lower rates compared to males (73.5% vs. 76.5%); individuals of low SEP were vaccinated more compared to the general population (77.0% vs. 73.7%). Body weight documentation reached 81.8% in (2013). The 85 years or older age bracket had the lowest rate (71.5%). Two benzodiazepine-use indicators were first measured in 2011. The rate of benzodiazepine overuse remained steady around 5% during the 2011–2013 measurement period; the rate of long-acting benzodiazepine use fell from 3.8% (2011) to 3.1% (2013). Benzodiazepine over and long-acting use were highest among those aged 85 years or older (10.8% and 4.1%, respectively) and among women of this age group (11.7% and 4.3%, respectively). Individuals with low SEP overused benzodiazepines at a higher rate compared to the general population (6.5% vs. 4.2%).

**Conclusion:** Most indicators demonstrated improvement, yet women received lower quality care than men in all measures. High elderly influenza and pneumococcal vaccination rates will decrease the burden of influenza and pneumococcal disease on the Israeli healthcare system. High body weight documentation rates allow for future quality indicator development to measure the rate of unintended weight loss in the elderly. The relatively high rate of benzodiazepine overuse and long-acting use confirms the need for continued practitioner-focused benzodiazepine prescribing education, in order to reduce the risks of high elderly benzodiazepine usage. Recognizing elderly Israeli populations who receive less than optimal care enables further development of population-specific healthcare changes to provide quality care to specific subgroup populations of elderly Israelis.

### ISQUAI6-2493

#### CARE IN THE ETHER - DEVELOPING A ROBUST CLINICAL REVIEW METHOD FOR TELEHEALTH

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**Objectives:** The quality of Healthdirect Australia's telehealth services underpins the contribution of its services to the Australian healthcare system. There is a high community expectation that telephone-based health consultation should be as safe as face-to-face consultation. Telephone-based health assessment and advice to an unseen and unknown patient carries potential risks. Over assessment of the acuity of the patient's condition can lead to costly and unnecessary service utilisation. Of more concern, under assessment of a condition may result in delayed commencement of treatment, longer or more intensive treatment and poorer health outcomes.

The principal objective of this project was to develop a reliable and evidence-based clinical evaluation model that can be used to periodically review the appropriateness, effectiveness and safety of healthdirect nurse triage and the after hours GP helpline.

**Methods:** The method used to determine the most effective evaluation model involved a scoping study of quality standards and auditing approaches that might be adopted to systematically review the service provider's fulfilment of contractual clinical obligations to provide high quality services.

The development method also involved a comprehensive literature review that was undertaken to specifically focus on the use of simulated patients to assess quality and safety in delivery of telephone triage and health advice. A multidisciplinary Clinical Advisory Panel was established to advise on selection of scenarios and importantly, to reach clinical consensus on the appropriate disposition or outcome that should be applied to a given scenario. Logistical and statistical issues were addressed and resolved and assessment and recording instruments were developed, adapted from a previous evaluation and validated clinical communication assessment tools identified in the clinical literature.

**Results:** The review model developed has two component parts.

The first is a method for auditing and reviewing the service provider's clinical policy, processes and structures that are required for effective clinical governance of the services that ensures good clinical practice. Examples of these are; credentialing policy and process; encounter documentation, both nursing and medical, including accuracy and completeness; incident review process and documentation

The second component is the use of clinical scenarios. The literature review provided international evidence on the use of this form of clinical review in other healthcare systems. Specific characteristics of the method include the number and type of scenarios presented, the number of "mystery shopper" calls to be made; the professional background and number of simulated patients participating in clinical review, the professional background and number of assessors of the simulated patient calls and methods used to test and confirm the reliability of those assessments.

**Conclusion:** The Clinical Review Model, using a clinical audit and the simulated patient method, developed for Healthdirect Australia is based on five key steps: identification of common case scenarios with an uncommon level of acuity presented in some scenarios; an annual series of simulated patient calls using trained medical actors; robust clinical and communications assessment of the calls; rapid feedback to the service provider, and provision of targeted professional development to address identified risks to patient safety and service quality.

Implementation of the model, in accord with Healthdirect Australia's Clinical Governance Framework, will strengthen risk management and quality improvement and enhance the quality of health assessment and advice services offered to Australian consumers.

### ISQUAI6-2572

#### AN INTEGRATED TOOL FOR EVALUATING THE FRENCH MANDATORY QUALITY INDICATORS USED FOR HOSPITAL IMPROVEMENT, PUBLIC DISCLOSURE AND REGULATION

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**Objectives:** Since ten years, quality indicators (QI) are mandatorily measured in all French hospitals. They are used for hospital quality improvement, public disclosure and regulation goals. After a decade of use, the Ministry of Health and the French National Authority for Health set up a task force to evaluate these QI. The goal was to provide a decision aid to the Ministry and HAS in terms of withdrawing, revising or continuing their use. As there was no available integrated tool, the task force started with the development and test of a tool during the year 2015. This tool aimed at evaluating the performance (measurement feasibility,

metrological performance and relevance for users) of QIs according to each of the three goals.

**Methods:** From a literature review and a review of national initiatives, we identified potential criteria for assessment. Using a modified Rand/UCLA Appropriateness Method, the appropriateness of these criteria was checked for evaluating the indicators according to each of the three goals. The taskforce, constituted by quality indicators researchers, hospital managers, quality managers and clinicians, extracted a list of criteria for each goal. Each criterion was assessed using a quantitative approach or a qualitative approach: The indicator's results collected the previous years were analyzed; the scientific soundness of the indicator development was reviewed; field hospital workers (doctors, nurses, managers), health authorities employees and patients were interviewed. All these data results were discussed by the task force, summarized and displayed on spider charts presenting standardized scores. This integrated tool was tested on four national process QIs related to nosocomial infections management.

**Results:** Three major experiences were studied, the Qualify method from the BQS institute in Germany, the Dutch Appraisal of Indicators through Research and Evaluation (AIRE) method and the method developed for AHRQ by the UCSF-Stanford Evidence-based Practice Center to refine the original set of HCUP QIs. Among the fourteen retrieved potential criteria, 12 were selected as appropriate for the evaluation of QIs for regulation use: Relevance (Importance of the quality characteristic captured for the health care system; Benefit/ability to take decision based on the results; Potential risks / Side effects), Feasibility (Understandability and Interpretability of the indicator and its results ; Barriers to Implementation due to data collection effort ; Delays related to data production), scientific soundness of the indicator development (Indicator evidence; Validity; Risk adjustment) and current metrological performance (Indicator Expression can be Influenced by Providers; Discriminatory power; Sensitivity to change). Among these, 11 were selected for hospital improvement and 7 for public disclosure. Applied to the four QIs, the task force proposed to withdraw the indicator related to multidrug-resistant bacteria management and to undertake major revision on the three others.

**Conclusion:** This integrated tool proved to be operational on four QIs. More research is needed to finalize the tool on other types of indicators. A core set of seven assessment criteria was identified to evaluate QIs for hospital improvement, public disclosure and regulation. Additional five criteria are needed for the goal of hospital improvement and regulation. These results have been presented to the Ministry QIs advisory group.

#### ISQUAI6-2984 COMPUTER AIDED QUALITY ASSURANCE IN THE PLANNING OF THE SURGICAL PATHWAY

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**Objectives:** The surgical pathway is a complex, cost-intensive activity within a hospital that should be managed efficiently. The aim of this study is to automatically manage the scheduling of the operating theatre through real-time monitoring of all critical steps in the perioperative process and to present this information in a structured and understandable fashion to the personnel.

**Methods:** We optimize operating room (OR) planning and scheduling by predicting OR time using the information that is available in the preoperative and perioperative phase. This includes both patient characteristics (e.g., age, gender, co-morbidity), and information that can be extracted from the OR environment in real-time, like the use and status of instruments and equipment. To first identify distinguishing phases in the procedure we monitor the activation pattern of specific OR equipment, such as the electrosurgical device. Activations of the electrosurgical device were detected with a current sensor placed between the power plug of the device and the socket in the OR. The activation pattern of the electrosurgical device was measured during 57 laparoscopic cholecystectomies. These patterns were used to train a support vector machine classifier that detects whether procedures are shorter or longer than a certain amount of time.

During 21 laparoscopic cholecystectomies the activation of the electrosurgical device was recorded and processed in real-time using pattern recognition methods. The remaining surgical procedure duration was estimated and the optimal timing to start preparing the next patient for surgery was communicated to the OR staff. A tablet was used to communicate the advice to the OR staff as well as to gather feedback about the usability of the estimated time.

**Results:** The mean absolute error in estimated procedure time was smaller for the real-time system (14 minutes) than for the OR staff (19 minutes). The system's estimates were more reliable for procedures with average or long duration than for the ones with short duration. For procedures longer than 40 minutes, the mean absolute error was 9 minutes. For these procedures, the system's estimates outperformed the OR staff (mean absolute estimation error of 29 minutes).

**Conclusion:** Computer aided perioperative planning of subsequent procedures on the basis of automated phase identification can support the decision making of the OR team members and of the and managerial staff, thereby improving the quality and throughput of the procedures. Crucial in this respect is that the registered information is consistent with the actual situation and fits the requirements, needs and wishes of the users.

#### ISQUAI6-3132 EFFECTIVENESS OF THREE INTERVENTION PROGRAMS DESIGNED TO IMPLEMENT WHO SAFE CHILDBIRTH CHECKLIST IN COLOMBIA

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**Objectives:** To evaluate the effectiveness of three different strategies for training in the use of WHO Safe Childbirth Checklist (SCC) in Colombia health institutions to improve neonatal and maternal patient safety.

**Methods:** Quasi-experimental before and after study. Three training programs were designed and implemented in three facilities for implementing of the use of WHO SCC. Random assignment to the intervention was performed. The safety behaviors were assessed in the four moments of the attention (on admission, just before pushing or caesarean, soon after birth and before discharge) on 29 births per institution, and the acceptance of the checklists was assessed in 38 workers of the institution A, 74 of the institution B and 50 of the institution C; each measurement was done before and after the intervention. Training was given to a minimum of 83% from the population in each institution.

Interventions were designed based on the recommendations made by the TeamSTEPS program to implement interventions to improve behaviors and attitudes in patient safety, and the Safe Childbirth Checklist Manual. In general, those interventions sought to cover some or all of the “4 E” proposed on strategies to translate the evidence into practice in safety: Engage, Educate, Execute and Evaluate; being the intervention A the simplest and the intervention C the most complex.

**Results:** The survey results showed that workers evaluated generally know, have used or currently use checklists, and showed favorable attitudes at an intermediate level, institution A presenting the biggest favorable attitudes.

Before the intervention, the rate of compliance on safety behaviors was between 72% and 79%, significant differences in the three institutions were found (Cochran's Q test = 57.8;  $p = 0.000$ ); the lowest percentage of compliance was given at the institution A and the largest in the institution B. In general, the least fulfilled behaviors were: checking if the mother requires antibiotics, starting the partogram, complying with the hand washing protocol, educating about danger signs and family planning to the mother and her partner, allowing the presence of a companion, and checking bleeding after birth and after the start of breastfeeding.

After the intervention, there were found significant differences in the percentages of compliance between after and before intervention in all institutions (McNemar test = 2726;  $p = 0.000$ ), but no significant differences in the percentages of compliance between the three institutions were found (Cochran's Q test = 3.36;  $p = 0.186$ ), this is because the institution that had the lowest score at the beginning reached the level of the other two and the other institutions maintained their compliance without major changes. However, there were significant differences in the implementation of the checklist, especially on admission. Institution C showed the highest percentage of adherence to the checklist (Cochran's Q test = 45.5;  $p = 0,000$ ). Behaviors that were met to a greater extent after the intervention were: starting the partogram, checking devices, and the initiation of breastfeeding; failure in the other behaviors remained.

**Conclusion:** At short-term the C intervention, which included a theoretical and practical workshop, simulation, and training in situ, achieved a greater adherence to the checklist. However, due to the

early measurement, this adherence was not reflected in an increase in the percentage of compliance to safe behavior, only in the application of the checklist in the moment of admission. It is recommended to do further measurements to evaluate the effect of interventions in the medium and long term, at a moment in which the institutions have been able to implement changes to improve adherence to the checklist.

## ISQUAI6-1697

### AN OBSERVATION AUDIT TOOL FOR NURSE-TO-NURSE BEDSIDE CLINICAL HANDOVER

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#### Objectives

1. Examine the reliability, validity and usability of a multi-purpose tool for training, coaching and auditing nurse-to-nurse bedside handover across an organisation and;
2. Evaluate the quality of nurse-to-nurse bedside handover practices.

**Methods:** A naturalistic, descriptive, mixed method study conducted in three stages:

- Stage 1- face and content validity of an existing tool were examined using literature review and focus group with five local nursing and midwifery experts.
- Stage 2- the tool was revised and pilot tested; the final 24-criterion tool included 52 items providing illustrative exemplars of expected handover behaviours related to content, process and environment aspects of handover practice, evaluated using a 3-point scale.
- Stage 3- an observation audit of 199 ‘real’ handover events across 5 wards; in 72 handover events, independent second observers were used to examine tool reliability; and unstructured field notes captured data on tool usability.

Descriptive statistics were used to analyse audit data; the Kappa statistic was used to measure inter-observer agreement to examine reliability. Qualitative description was used for qualitative analyses.

**Results:** Content validity was supported by both literature and expert review. Whilst also supported, face validity and usability were impacted by the volume of items and the relevance of the exemplar behaviours to the local context of practice. Use of Kappa statistic (K) to measure inter-observer agreement revealed 30 illustrative items were acceptable with ‘moderate’ or ‘good’ agreement (K 0.41 or higher); 14 items had ‘fair’ agreement (K 0.40 to 0.00); and of the remaining items, 4 had poor inter-observer agreement (K < 0.00), and K could not be calculated for 4 items. Inter-observer agreement was acceptable for 70.5% (n = 11) of content items, 58.8% (n = 10) of process items and 44.4% (n = 8) of environment items.

The organisation set a benchmark for illustrative behaviours to be observed in 80% of handovers. Analyses revealed only 11.7% (n = 2) behaviours related to handover content, 17.6% (n = 3) behaviours related to handover process, and no behaviours related to environment were observed in more than 80% of handovers.

**Conclusion:** This research provides a model and tool for ongoing quality improvement that addresses the three key components of nurse handover practice: content, process and environment.

The content and face validity of the nurse-to-nurse bedside handover tool was acceptable, however use of context specific exemplars could improve face validity and usability, particularly when evaluating behaviours related to handover processes and environmental safety. Reducing the volume of exemplar behaviours may improve inter-observer agreement.

Findings reveal a need to improve understanding about the scope of handover practice, particularly the recognition of process and environment influences on patient safety. Future research is needed to validate the tool across a wide range of handover settings.

Measuring nurse handover practices in the 'real world' is complex. This research revealed limited understanding of the scope of nurse handover practice, and provides a tool to facilitate education, coaching and quality audit.

## ISQUAI6-2509

### QUALITY AND SAFETY IN THE OLDER PERSON'S UNIT: A RESILIENCE ENGINEERING APPROACH

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**Objectives:** The Older Person's Unit presents a challenging clinical environment in which multi-disciplinary teams must work together in order to achieve a range of patient objectives. We argue that a Resilience Engineering approach offers valuable insight to understanding the complexities associated with routine work in this context.

**Methods:** This study, set in the Older Person's Unit of a large London teaching hospital, utilises a Resilience Engineering approach in order to better understand the complexity surrounding this clinical setting. Over the course of an 18 month period, the research team were embedded within the hospital environment collecting a wide range of qualitative and quantitative data. The study generated extensive data, including over 60 hours of observational data and 15 interviews with staff across a range of clinical roles, as well as experiential reflection by the researchers. The process of data collection was informed by a theoretical model of resilience in healthcare system performance, as outlined by Anderson et al. [2016].

**Results:** The research process identified six broad themes that captured important aspects of work in the Older Person's Unit. The themes were: discharge planning and Multi-Disciplinary Team

meetings (MTDs); performance review and learning; family and social services; staff roles and clinical task co-ordination; care delivery; and acute disruptions. For the purpose of this presentation, we focus specifically on discharge planning and MTDs.

The research indicated that patient discharge is a complex process requiring continual adjustment and adaptation in response to evolving patient needs, and to a wide range of internal and external hospital pressures. Coordinating mechanisms include artefacts for sharing information, case presentations and discussions, and the MTD meetings. Findings further highlighted misalignments between the demand for services post-discharge and the availability of those services, as well as variability due to individual patient factors including the availability of carers, personal preferences, and home environment. Staff must also successfully manage competing priorities by trading off goals. For example, discharging a patient even if they may not be 'completely ready' (and at higher risk of readmission) might become necessary because of an infection outbreak or pressure of bed availability. Conversely, patient stay may be extended last minute because of concerns about safety at home.

In summary, the study highlighted that monitoring the complex discharge process and determining what criteria remain to be fulfilled before patients can be discharged is difficult because there is no up-to-date artefact documenting patient progress that is shared across the different staff groups. Furthermore, coordinating mechanisms for discharge activities lack transparency, are heavily reliant on nursing resources and may be heavily disrupted by small disturbances.

**Conclusion:** We argue that a Resilience Engineering approach provides the insight to better understand the complexity of activities associated with the Older Person's Unit. The approach therefore lends itself well to inform quality improvements and may pave the way in offering guidance for interventions which can support staff to anticipate, monitor, learn and respond to system demands in the clinical environment.

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## ISQUAI6-1718

### IMPROVING SEVEN-DAY POST-OPERATIVE FOLLOW-UP RATE AT IGANGA ISLAMIC MEDICAL CENTER IN UGANDA

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**Objectives:** 1. To improve the proportion of circumcised clients who return for the seven-day post-operative follow-up visits using a systematic quality improvement approach.

**Methods:** Among the key objectives of USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project in Uganda is to

support other implementing partners. One such partner is USAID Uganda Private Health Support Program (USAID UPHS) which directly supports Iganga Islamic Medical Center to deliver quality and safe HIV prevention, care and treatment services. This has been done using the quality improvement approach to ensure and support safety for the clients receiving voluntary medical male circumcision (VMMC) for HIV prevention. The improvement work began by supporting USAID UPHS to collect baseline data on particular quality improvement indicators like seven-day post-operative follow-up rate that showed a median performance of 0% across the baseline period of January to June 2014, which is way below the required standard of 100%. The health facility was supported to form an improvement team which received training in quality improvement systems, processes and approaches followed by monthly site coaching visits. During the problem analysis discussion with the health care workers it was identified that appointments were just being written on the client cards as required but with no explanation to the clients about the benefits or importance of the seven-day post-operative follow-up. The health care workers were then oriented on the importance of the seven-day post-operative follow-up visits; they decided to also emphasize and discuss this with the clients during the group pre-operative client education in addition to giving the required appointment dates. Systems were also set up to ensure that clients circumcised during outreaches were also reviewed by the health care workers going back to the outreach site on the seven-day appointment date. These activities were made part of the routine activities and a schedule drawn for responsible persons to do the pre-operative group education for the clients to be circumcised.

**Results:** The proportion of circumcised clients that returned for the seven-day post-operative follow-up visit progressively improved to 75% by February 2015 and to 91% by April 2015 having incorporated going to the outreach sites on the follow-up appointment dates. This good performance has been sustained beyond October 2015 when the site was phased from the intense support to a light support site. Post-operative follow-up visits have been maintained above 95%. **Conclusion:** Following a systematic approach to addressing gaps and involving the key players in the improvement process to select particular interventions increases the chances that they will be adopted and hence their success. Health care workers have to clearly understand the benefits of post-operative follow-up for them to clearly explain to the clients these benefits.

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#### ISQUAI6-2321

##### SPEAKING UP FOR PATIENT SAFETY SURVEY

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**Objectives:** Embedding a positive safety culture is of critical importance to patient safety. The Royal Melbourne Hospital (a tertiary, teaching and referral hospital in Victoria, Australia) aimed to rebrand the validated and standardised Safety Attitudes Questionnaire (into the Speaking up for Patient Safety Survey) to provide a baseline snapshot of the organisation's safety culture. The objective was to use the consequent diagnostic findings to devise an improvement program that addressed any potential gaps.

**Methods:** The survey was administered electronically throughout 46 clinical work areas. Logistical and administrative support for survey administration was engaged from Pascal Metrics, a US based company with expertise in clinical data analytics.

**Results:** Fifty-nine percent (59%) of eligible staff (n=1867) responded to the survey. When compared to organisational peers, the Royal Melbourne Hospital performed favourable in relation to Safety Climate, Job Satisfaction, Perceptions of Local Management and Teamwork. Unfavourable results were observed in relation to Stress Recognition, Perceptions of Senior Management and Working Conditions. An overall organisational safety rating score of 65% was obtained where an exemplar would be expected to score 80% or more.

**Conclusion:** A baseline survey of the Royal Melbourne Hospital's safety culture shows that there are specific areas for improvement. The obtained data will now be utilised by local work areas to devise improvement plans and a follow up survey during 2017 will allow the organisation to evaluate the effectiveness of recent initiatives such as "Safety First" and the Cognitive Institute's Safety Culture Program.

#### ISQUAI6-2687

##### EXPERIENCES OF IMPLEMENTING OCCUPATIONAL HEALTH SERVICES DRIVEN INTERVENTION METHODS FOR SUSTAINABLE LEADERSHIP IN HEALTH CARE

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**Overview:** Development processes in health care often narrowly focuses on more efficient work processes even though health care employees' report an increased strained working environment. Occupational Health Services (OHS) in Sweden have been criticized for not contributing to improved organizational health and for having limited competence on how leadership and organizational factors impact employee health. In this context an ongoing research project has developed and implemented OHS-driven leadership interventions on sustainable leadership in health care. The interventions focused on supporting managers to integrate health promoting processes into ongoing quality developments at their workplaces.

**Objectives:** To explore experiences and outcomes of the implementation of different kind of OHS-driven methods for sustainable leadership within health care. The aim includes analyzing key

actors' and managers' experiences of the content and different forms of intervention methods, as well as if different intervention methods give differences in outcomes.

**Methods:** Researchers developed in a first step a working material on sustainable leadership as well as five different intervention methods including web-based methods in collaboration with practitioners. Representatives from OHS were given education on leading interventions based on the developed material. In a second step leadership interventions were implemented at 32 different workplaces within health care including hospital care units, dental care and elderly care. Qualitative interviews with 24 key actors and managers were performed for studying the implementation process. Latent and manifest content analysis was applied. Outcomes of the interventions were studied through an ongoing survey to participating managers and employees at T0, T1 and T2. The survey at T2 will be finalized in May 2016.

**Results:** A dedicated and functional collaboration between OHS and Human Resources, as well as with the researchers, was one important success factor for the implementation of the interventions. Support from and collaboration between researchers and different strategic key actors within the participating health care organizations was further more critical for succeeding with the interventions. Web-based interventions required more engaged managers compared to interventions with physical meetings. Preliminary results showed that for example the employee's job crafting (0,002) and vitality (0,001) increased between T0 and T1. However, decreased the leadership support to employees between T0 and T1 (0,04) in the physical interventions. There was no significant difference in leadership support between T0 and T1 after the web-based interventions.

**Conclusion:** The outcomes from the interventions showed preliminary positive outcomes on employee health. Leadership support to employees decreased directly after the intervention. The long term outcomes of the intervention between T0-T2 will be presented at the conference. Practical implications are that collaboration and support within the work organization is critical for successful interventions on sustainable leadership.

#### ISQUA16-2887

### PATIENTS' STORIES: CAN THIS INSIDER VIEW BE USED TO SUPPORT MEDICATION ADHERENCE IN KIDNEY TRANSPLANTATION?

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**Objectives:** Using experiences of kidney transplant recipients, this qualitative sequential study sought to develop a video compilation of patients' stories. The video, underpinned by the Theory of Planned Behaviour, has been implemented as part of a multi-

dimensional intervention, to support medication adherence in kidney transplant recipients at 1 – 4 months post-transplantation.

**Methods:** All five hospitals that offer adult kidney transplantation in Victoria, Australia, were involved in this study. To explore issues of medication adherence, semi-structured interviews were conducted with 25 patients who had either maintained their graft for at least 8 months or had experienced a graft loss because of medication non-adherence. Interviews were analysed to identify the storytellers and the story surrounding patients' medication experiences with their kidney transplant. Based on age, ethnicity and gender, 13 participants were purposely selected to be the storytellers in the video. The interview footage was reviewed by two researchers and organised using NVivo software. The final content of the video was evaluated by a panel of 5 healthcare experts, 2 content experts in the field of kidney transplantation, 1 independent educational expert and 2 kidney transplant recipients using Lynn's content validity questionnaire.

**Results:** The final 18-minute video comprised of 15 sections. The video has been viewed and was well-received by 33 newly transplanted kidney recipients. The video was perceived to have helpful content and clearly conveyed messages about the absolute necessity of good medication-taking behaviour in ensuring a successful transplant.

**Conclusion:** In kidney transplantation, this medium is a novel way to engage and support patients to adhere to their medications and avoid the negative consequences of medication non-adherence. This study provided evidence that healthcare experts, content experts, educational expert and kidney transplant recipients support the use of patient stories. The video has the potential to promote medication adherence in an appealing format, which can complement the existing medication education and follow-up that patients receive.

#### ISQUA16-1963

### MENTORING AND EDUCATION TO IMPROVE CONFIDENCE OF STAFF CARING FOR PEOPLE WITH DEMENTIA IN ACUTE HOSPITALS

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**Objectives:** For many patients with dementia, a stay in hospital can lead to significant safety and quality issues [1]. The unfamiliar surroundings of a hospital ward, ongoing staff rotations, noise, lighting and movement as well as interactions with numerous staff and staff attitudes and behaviours can lead to escalation in behavioural and psychological symptoms of dementia (BPSD) [2, 3]. The key objectives of this project were to trial and evaluate a program of mentoring and education about dementia care for capacity building in the hospital sector; and to improve knowledge, skills and confidence in staff in caring for acute patients with dementia.

**Methods:** The program implemented consisted of a combined approach that offered education, a team based approach to assessment and care planning, mentorship, education about increased use

of non-pharmacological approaches and dementia friendly environments. The program was implemented in two acute hospitals in Melbourne Australia. A mixed methods evaluation collected data before, during and after completion of the program. Data sources were: environmental audits, interviews and surveys of staff, training workshop evaluations, evaluations from medical staff tutorials, secondary data from hospital records, notes from team meetings and informal discussions, and secondary data about 'incidents' during the trial period. Triangulation of data sources was used to evaluate the impact of the program.

**Results:** Short term outcomes for the program included: increased awareness about dementia and behavioural and psychological symptoms of dementia; a change in attitudes about caring for people experiencing BPSD; change in skills, knowledge and confidence; increased range of evidence-based non-pharmacological approaches being available and used in target wards; and key staff confident and supported in their leadership role to promote positive change with in their teams. There was some evidence that 'incidents' were reduced although no causal link was able to be drawn.

**Conclusion:** The mentoring and education program was successful in improving quality of care as reflected in staff knowledge attitudes and skills provided to people with dementia in acute hospitals. Future evaluation will assess the satisfaction of patients and their families with the changes in service.

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#### ISQUAI6-2622

##### EFFECTIVENESS OF IMPLEMENTING THE SMOKE-FREE HOSPITALS PROGRAM IN IMPROVING QUALITY

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**Objectives:** In Taiwan, tobacco is associated with 20,000 deaths each year among 3.5 million smokers. Our hospital has joined the Smoke-Free Hospital Program in 2015 to help smokers quit smoking. This study aimed at evaluating the effectiveness of smoking abstinence at our hospital after implementation of the program involving patient education and pharmacotherapy.

**Methods:** The number of participants in the program and 3-month smoking abstinence rate were compared before and after implementation of the Smoke-Free Hospital Program between January 2014 and October 2015 in a tertiary referral hospital

setting (E-Da Hospital). Successful smoking cessation was defined as: reported non-smoking in recent 7 days. Procedures of program implementation were as follows: (1) Outpatients or family members who are known smokers were referred to the smoking cessation counselor by the physicians; (2) The counselor provided the information about the health risk associated with tobacco use and referred the patient back to the Smoking Cessation Clinic for those willing to quit; (3) Telephone follow-ups were conducted for smokers who had received the smoking cessation service at first, third, and sixth month after program implementation according to the NSFH guideline. The frequency was increased to 4 times every 3 months in our program; (4) Registration fee was not charged for patients with concomitant visit to other outpatient clinics; (5) Hospital personnel with the highest rate of referral were acknowledged and rewarded for their efforts; (6) Smoke-free environment was promoted through organization of an inspection team for constant surveillance of the hospital environment; (7) Seminars on tobacco control were organized in schools, commercial and community organizations; (8) Smoking was discouraged for pregnant women and their family members; (9) Smoking cessation was encouraged among hospital staff by providing rewards; (10) Opportunities were provided for experience-sharing for hospital personnel who were successful quitters.

**Results:** Before the Smoke-Free Hospital Program implementation (2014), totally 69 participants joined the Taiwan government-sponsored smoking cessation program at our hospital and 29 patients had successfully quit smoking after three months of pharmacotherapy and counseling. After the implementation of 2015 Smoke-Free Hospital Program, 181 participants successfully quit out of a total of 480. The 3-month smoking abstinence rates after counseling and pharmacotherapy were 34.8% of 925 person-time and 37.8% of 453 person-time, respectively. The quantity of smoking cessation service through counseling was substantially increased from 119 person-time in 2014 to 925 person-time in 2015 (777%). Besides, the quantity of participants receiving pharmacotherapy was remarkably elevated from 128 person-time in 2014 to 453 person-time in 2015 (354%).

**Conclusion:** The results of this study demonstrated that effective patient education through counseling and pharmacotherapy as well as program endorsement among hospital staff could significantly improve the quality and quantity of smoking cessation in a tertiary referral hospital setting. Therefore, we will keep promoting smoke-free environment and apply our plans to maintain 3-months smoking abstinence rate above 33%, which was the target goal of smoking cessation services from the government of Taiwan.

#### ISQUAI6-3009

##### UNDERGRADUATE STUDENTS PERCEPTIONS AND SATISFACTION WITH THE QUALITY OF THE INTEGRATED MEDICAL CURRICULUM

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**Objectives:** The College of Medicine in the University of Dammam has implemented an innovative integrated undergraduate medical curriculum since 2014 in order to reform the quality of undergraduate medical education, to achieve Saudi-NCAAA accreditation for the college of medicine and to support quality improvement in Saudi Healthcare system. Like any innovative curriculum it needs to be evaluated for proper implementation. The main objective of this study is to evaluate student perceptions and satisfaction with the quality of the integrated medical curriculum.

**Methods:** A cross-sectional survey was conducted during December 2015 among the two cohorts of medical students studying the integrated medical curriculum in the college of medicine. A sample of 409 medical students was interviewed. A survey questionnaire for course quality evaluation was developed and pretested. In total 35, student perception and satisfaction items were included. Each scale item was measured with a 5-point Likert-type scale. Data was analyzed using SPSS. Cronbach's alpha coefficient (minimum recommended value 0.7) was used to measure scale reliability. Pearson Chi-Square test was used to measure statistical significant associations and a significant p-value cut-off point was set at < 0.05.

**Results:** Student participation in this study was 87%. Cronbach's alpha coefficient 0.88 for 35 quality perception and satisfaction scale items infers the fact the scale items are internally consistent and reliable. Gender distributions among students are 48.9% male and 51.1% female. Among the 409 students, 44.3% were from first cohort and 55.7% were from second cohort. A majority of students revealed positive perceptions on various components of course quality except on the timely feedbacks to them about their continuous assessments during the course, which had very high negative student perceptions (82.2%). Student satisfaction with their overall course quality evaluation was 77.3% as compared to 22.7% who were dissatisfied. Student satisfaction with the quality of Problem Based Learning (PBL) was very high 92.5% as compared to 7.5% student who were dissatisfied. With early clinical exposure the student satisfaction with clinical skill sessions was 87.3% as compared to 12.7% dissatisfied. While 66.5% students were satisfied with various assignments throughout the course, 33.5% students were dissatisfied with them. Student satisfaction with active participation with and cooperation among themselves during the course was 88.3% and 87.3%. Student satisfaction with the quality of individual departments such as immunology, microbiology, PBL, biochemistry and clinical skills was high. However, disciplines such as pharmacology; weekly-review-&-quiz; health knowledge and society; health promotion and knowledge management; student seminar and student project cases (SPC) induced higher level of dissatisfactions among students. PBL and clinical skills are found to be significantly ( $p < 0.05$ ) associated with overall course satisfaction.

**Conclusion:** Positive student perceptions of and higher overall satisfaction with the quality of the integrated medical curriculum in the University of Dammam did not rule out the student dissatisfactions with the quality of various individual discipline and components in the curriculum. Continuous Quality Improvement (CQI) in all the aspects of curriculum implementation is necessary to support the overall quality improvement of the integrated curriculum. Further

research is recommended to explore the expectations of both students and faculty from the integrated medical curriculum. Also to compare their expectations with their perception and satisfaction, in turn to possibly to discover quality gaps with the ultimate goal of improving the quality of medical education in Saudi Arabia.

## ISQUA16-2645

### PATIENT EMPOWERMENT THROUGH HEALTHCARE UNIT ACCREDITATION PROCESS

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**Objectives:** The aim of this study is twofold. First, to review the level of compliance of patient-centered care related standards after the first assessment. Secondly, to identify relevant improvement areas achieved through the accreditation process.

**Methods:** It is a cross-sectional descriptive study utilizing data collected in the accreditation process of Primary Healthcare (PH) and Specialized Healthcare (SH) Units, between 2014 and 2015. Results describe the level of compliance for compulsory patient-centered care standards (stage 1) and the improvements achieved after the certification process (stage 2).

**Results:** 153 Units were accredited in 2014 and 2015 (91 PH; 61 SH)

Stage 1. Standard description and % of Units complying against total assessed:

1. Patient rights and obligations 100%;
2. Patient privacy 95%;
3. Information 100%;
4. Informed Consent 72%;
5. Living will 91%;
6. Decision-making substitution 87%;
7. Ethics Committee 90%;
8. Reference professional 97%;
9. Election of specialist and second medical opinion 93%

Stage 2. Improvement areas implemented in Units after not complying compulsory standards in the first assessment:

Patient privacy:

- Redistribution of spaces (33% PH, 17% SH), separation panels installation (33% PH, 83% SH)
- Standard operational procedure (SOP) to guarantee patient privacy (33% PH, 40% SH)
- Assessing patient satisfaction on privacy and confidentiality (20% PH)

Informed Consent:

- System to assess and improve the Informed Consent (IC) gathering and filling process (93% PH, 64% SH)
- Ensure that IC formularies are adapted to current regulations (31% PH, 43% SH)
- Guarantee patient keeps a copy of the signed IC (7% PH)
- Training session (17% PH, 36% SH)

Living will:

- SOP for the consultation of patient advance directive (21% PH, 33% SH)

- Training on how patients can register their living will and how professionals can consult them (64% PH, 100% SH)
- Communication channels to inform users how to register its advance directive (36% PH, 67% SH)

Decision-making substitution:

- SOP for the decision-making substitution (56% PH, 100% SH)
- Training session and case studies (63% PH, 33% SH)

Ethics Committee (EC):

- SOP to formulate consults to the EC (33% PH)
- Diffusion and training on the procedure (67% PH, 100% SH)
- Communication channel allowing professionals to know EC protocols of action (17% PH, 25% SH)

Reference professional:

- SOP for the correct identification of professionals during the health care process (100% PC, 67% SH)
- Informative session for health care professionals (33% SH)

Election of specialist and second medical opinion:

- SOP for the election of specialist and the second medical opinion (13% PH)
- Diffusion channels to divulge the possibility of exercising this right (88% PH, 100% SH)
- Training session for professionals (25% PH, 50% SH)

**Conclusion:** Healthcare Units on the accreditation process showed a high level of compliance on the standards related to patient the rights, privacy and informed decisions.

Areas for improvement implemented by Units to achieve accreditation included mechanisms to increase patient's involvement on their healthcare process, enabling them to undertake informed healthcare decisions and choosing when to let others act on their behalf. Various improvement actions aimed to ensure professionals were properly informed and systems placed in the healthcare centers to guarantee the execution of patients' choice, in line with ethical principles and respecting their dignity.

The accreditation process contributes with the implementation of three key factors to shift the health system towards a patient centered care model: well-established procedures, patient awareness and health professional involvement.

## ISQUA I6-2526

### GOVERNANCE STANDARDS FOR ABORIGINAL HEALTH SERVICES - A COLLABORATIVE JOURNEY

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**Objectives:** In an effort to better reflect the context and governance structures of Aboriginal Health Services (AHS) organizations,

the Qmentum Governance standards were revised in collaboration with an advisory committee of representatives from the Aboriginal community. The new Governance for Aboriginal Health Services standards were developed in 2015 and released to clients in January 2016.

**Methods:** Developing standards is a rigorous process designed to ensure that standards are measurable, relevant, evidence-informed and serve as effective tools for transforming knowledge to practice. This development process began with a scoping literature review, followed by focus groups to gather contextual knowledge related to governance structures in AHS organizations. The revision was further supported through convening an expert advisory committee with national representation from Aboriginal communities and surveyors to build consensus around the standards and language in a collaborative way. Next, a national consultation was held to obtain broad feedback on the revised standards prior to finalization. This feedback was incorporated and a final validation was performed with the expert advisory committee, prior to releasing the new standards in January 2016.

**Results:** Several key findings emerged from the literature review, and focus groups:

- The structures of Aboriginal governing bodies are highly variable and tend to be community-oriented rather than corporate in nature
- Governance standards based on a traditional corporate (board) model may not fit the Aboriginal community context
- Standards language and terminology should be culturally relevant

As a result of these findings, several changes were integrated into the standards. Existing standards language was revised to better reflect the context of the Aboriginal sector, moving away from corporate-focused language, and embracing the community nature and values of the health organizations. The glossary and the guidelines in the standards were revised to use language and examples relevant to the Aboriginal health service sector and include concepts such as cultural safety.

Further, the expert advisory committee suggested that the application of the standards should be flexible for different types of governance structures, and as a result, a customization feature was developed to tailor the standards to the context of the specific health organization being surveyed.

**Conclusion:** The revision of Governance standards using a rigorous process of research and consultation with experts has resulted in a product, new Governance for AHS Standards, which is more inclusive and culturally relevant for AHS organizations. The new language and collaborative process of development was critical in achieving a product that is client-centred. Respect for cultural traditions and values and the concept of cultural safety are key elements for this sector that are now built into the standards. Accreditation Canada will continue to work with Aboriginal clients to build capacity in their organizations and communities by offering products that are developed collaboratively and are culturally appropriate.

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## ISQUIA16-2476

### IMPROVING THE SAFETY AND QUALITY OF HEALTH CARE FOR ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE USING THE AUSTRALIAN NATIONAL SAFETY AND QUALITY HEALTH SERVICE STANDARDS

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**Objectives:** To identify actions to improve the care of Aboriginal people accessing mainstream hospital services, using the National Safety and Quality Health Service (NSQHS) Standards as a lever for driving change: and to describe strategies to be incorporated into future NSQHS Standards to address the safety and quality needs of Aboriginal people.

**Methods:** During 2015 a multi-method approach was adopted. This involved a literature review of evidence-based strategies to improve the safety and quality of care for Aboriginal people. This was followed by consultation with stakeholders, using interviews, focus groups and an online survey. Each consultation process asked about the common factors that resulted in poor health outcomes for Aboriginal people and what good care would look like to identify the common safety and quality gaps in care faced by Aboriginal people. Finally, the safety and quality issues were mapped to the NSQHS Standards to identify gaps in Standards and opportunities for change.

**Results:** The literature review identified limited evidence of theoretic, applied or trialled interventions to improve care. The factors found to improve care for Aboriginal people were: the cultural competency of a health service, the health service establishing partnerships with local Aboriginal communities; flexible service delivery models and increased employment of Aboriginal health providers.

Twenty-five consultation sessions with over 200 Aboriginal and non-Aboriginal people providing a comprehensive list of safety and quality issues, including: not identifying Aboriginal people at presentation leading to poor monitoring of care and outcomes; limited cultural competency of health services; inadequate communication with family and carers; poor communication of clinical information at transitions of care; unco-ordinated care post discharge; low levels of participation in the health workforce by Aboriginal people; and racial bias.

The online survey resulted in 876 responses, of which Aboriginal respondents comprised 20%. The top four areas where respondents believed organisations should take action were improving communication with patient and carers (70%); considering social and geographic factors in planning for discharge (53%); addressing issues of patient trust in mainstream health services (52%); and improving the cultural competency of staff (52%).

Areas for improvement in future Standards were identified: setting and implementing goals for Aboriginal consumers; identifying Aboriginal people in clinical records systems; environments that recognised the importance of cultural beliefs and practices; improving the cultural competency of the workforce; effective communication particularly at discharge; and, the provision of comprehensive care.

**Conclusion:** Australia's Aboriginal people have major differences in health outcomes when compared to the wider community. There are disparities not only for health status, health outcomes and the social determinants of health, but are also in the way that people access and use health services. Improving the health of Aboriginal people is a national priority. Understanding the factors that limit improvements in care for Aboriginal people provides an opportunity to develop standards to drive change throughout the health system.

As a result of this project, six Aboriginal specific actions are to be included in version 2 of the Australian NSQHS Standards. While not specifically naming Aboriginal people, there are over 60 additional actions where guidance could identify specific strategies to improve the healthcare experience of Aboriginal consumers accessing care in mainstream health services.

## ISQUIA16-1522

### QUALITY AND PREDICTORS OF DIABETES CARE AMONG PATIENTS WITH SCHIZOPHRENIA

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**Objectives:** Data on the quality of care for diabetes among patients with schizophrenia remain sparse, in particular from universal and free of charge health care systems. This study aimed to compare the quality of care for diabetes among patients with and without schizophrenia in Denmark and to identify predictors of quality of care.

**Methods:** In a nationwide population-based cohort study, we identified 83,813 diabetic patients including 669 with schizophrenia between 2005 and 2013 from Danish national registries. Quality of diabetes care was defined as having fulfilled guideline recommended performance measures of care. The examined potential predictors of diabetes care among patients with schizophrenia included patient-, (gender, age, abuse, the Global Assessment of Functioning (GAF) score, disease duration of schizophrenia) provider-, (preceding received quality of schizophrenia care) and



system-specific factors (contact volume defined as the individual diabetes clinic's average caseload volume of patients per year during the study period).

**Results:** Compared to patients without schizophrenia, patients with schizophrenia had a lower chance of receiving a high overall quality of care (i.e., fulfilling  $\geq 80\%$  of all performance measures of care) (Relative risk (RR) 0.91, 95%CI: 0.88-0.95) as well as individual performance measures including blood pressure measurement (RR 0.98, 95%CI: 0.96-0.99), treatment with antihypertensives (RR 0.83, 95%CI: 0.70-0.97) and ACE (angiotensin converting enzyme)/ATII (angiotensin receptor blocker) inhibitors (RR 0.72, 95%CI: 0.55-0.93), albuminuria measurement (RR 0.96, 95%CI: 0.93-0.99), eye examination at least every second year (RR 0.97, 95%CI: 0.94-0.99) and feet examination (RR 0.96, 95%CI: 0.93-0.99). Predictors of care included age, abuse, duration of schizophrenia and contact volume.

**Conclusion:** Quality of care for diabetes was substantially lower for patients with schizophrenia compared to patients without schizophrenia. Predictors of care included both patient- and system-specific factors.

### ISQUAI6-2943 THE COMPREHENSIVE COST OF ILLNESS OF FRACTURE IN JAPAN

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**Objectives:** Japanese society is ageing rapidly and the risk of falling and fracture is high among the elderly. The fracture is a major cause of disability, and has become a serious social problem. The purpose of this study is to estimate the comprehensive cost of illness (C-COI) of fracture using the Japanese official statistics.

**Methods:** Japanese society is ageing rapidly and the risk of falling and fracture is high among the elderly. The fracture is a major cause of disability, and has become a serious social problem. The purpose of this study is to estimate the comprehensive cost of illness (C-COI) of fracture using the Japanese official statistics.

**Results:** C-COIs of fracture were 15,450 billion JPY in 2008, 14,802 billion JPY in 2011, 16,382 billion JPY in 2014. Comparing the C-COI of 2014 with that of 2008, direct cost (medical) increased by 1.40 times, direct costs (LTC) by 1.27 times, family's burden by 1.17 times, respectively, although mortality cost decrease to 0.73 times of that of 2008. The average ages of death were 61.0 years in 2008, 64.7 years in 2014, the average hospitalization ages were 65.5 years in 2008, and 66.9 years in 2014, and the average outpatient ages were 55.6 years in 2008, and 57.1 years in 2014; they all increased during this period. As for composition of the total of C-COI, the direct cost (LTC) and family's burden occupied 92.3% (2014). Estimation results were shown in the following table.

**Table 1** C-COI of fracture in Japan

	(billion JPY)		
	2008	2011	2014
Direct cost (Medical cost)#	638	682	893
Morbidity cost#	229	246	239
Mortality cost#	170	143	124
Direct cost(LTC)\$*	5,889	6,569	7,505
Family's burden\$*	6,525	7,163	7,620
C-COI	15,450	14,802	16,382

\* Data from 2007, 2010, 2013

# Original cost of illness developed by Rice D

\$ Newly added cost component

**Conclusion:** The C-COI of fracture increased, and the direct cost (LTC) and family's burden accounted for about 90%. Decrease in mortality cost was supposed to be caused by decrease in the number of deaths and reduction of human capital value with increasing average age of death. In estimating the social burden of diseases whose sequela and disability are the problem to the society, C-COI would be more useful than the original COI.

### ISQUAI6-2769 SOMETIMES LESS IS MORE! MANAGING WISELY LABORATORY TESTS AMONG HOSPITALIZED PATIENTS

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**Objectives:** Interest in the subject of choosing of medical tests and treatments wisely is growing. The underlying principle is the desire to use evidence-based medicine (EBM) and the need to decrease excess medicine in general and the unnecessary ordering of repeated tests in particular. Consequences of overuse include patient exposure to infections, pain and stress, as well as extra work for the laboratory staff and unnecessary costs. It is relatively easy to set standards and monitor special treatments and tests. However, it is more difficult to determine standards for routine laboratory tests performed on hospitalized patients.

**Objective:** Decrease excessive blood tests among in-patients by developing a method to map the extent of repeated routine tests in all departments, and to intervene when necessary.

**Methods:** Five Internal Medicine departments (similar in patient mix and size) were piloted. We focused on blood count and chemistry tests and developed a computerized report of tests ordered. An index was created to determine the number of repeat tests for each patient and for each test in every department. It is expressed as an index that provides a measure of the number of repeated tests. An intervention was implemented in the department with strikingly excessive orders, data were collected and on-going follow-up was conducted.

**Results:** One department was reordering tests at a 30% higher rate than the rest of the pilot departments (index 2.0 vs. 1.6). As a

result, interventions included appointing a departmental representative, collecting data for six months with regular feed-back to the department along with periodic discussions on the progress and improvement plan. After the intervention, repeat tests ordered by the department decreased to 1.5 (compared to an average 1.6 in other departments).

**Conclusion:** Awareness of the phenomenon of excessive use of routine laboratory tests led to the development and implementation of a quantitative method to estimate the rate of repeated tests and to compare across departments and institutions. This method allows management to detect variances and encourages departments to establish clear criteria for ordering routine laboratory tests.

### ISQUIA16-3153

#### THE IMPLICATIONS OF VARIATION IN RISK ADJUSTED COST OF CARE OF HOSPITALIZED PATIENTS ON COMPLICATIONS, COST, LENGTH OF STAY, AND READMISSION WITHIN 30 DAYS

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#### Objectives

1. Present a risk adjustment strategy for addressing variation of cost of care
2. Describe variation in risk adjusted cost of hospital care at US academic medical centers
3. Illustrate implications of risk adjusted cost variation relative to outcomes of inpatient care: cost, length of stay, complications, in-hospital death, readmission.

**Methods:** This is a retrospective cohort study incorporating risk adjustment models to predict cost of inpatient care. The study cohort included adults hospitalized in US academic medical centers between October 1, 2014, and September 30, 2015. Risk adjustment for 330 base Medicare Severity Diagnosis Related Groups (categories of MS-DRGs related by having the same principal reason for care), was the basis for the cost risk adjustment models. Vizient's clinical database/resource manager (CDB/RM) was the source of the data; it is populated by nearly 300 hospitals (115 academic medical centers and 185 of their hospital affiliates). Variation was calculated as the standard deviation of risk adjusted costs by hospital and MS-DRG, and z scores were generated and averaged by hospital for hospital comparisons.

**Results:** Cost variability was found to be a predictor of variation in outcomes, including length of stay, the rate of complications of care, in-hospital death, and readmissions. Greater cost variability was associated with longer stays, higher complication rates (nearly 100% higher in the highest quartile of hospital z scores), higher in-hospital mortality (more than 7 times higher), and more frequent readmissions. These observations were consistent across several dimensions: MS-DRG, Major Diagnostic Category

(MDC), hospital, and time. Risk adjusted cost for patients with complex pneumonia, coagulation, and bone disorders as well as infected knee procedures and skin trauma had the most variation in cost while transplant patients (liver, kidney, pancreas, and pancreas/kidney) were among the case types with the least cost variation.

**Conclusion:** Strategies for reducing cost variation should include initiative related to better managing characteristics of patient's stays, for example, length of stay (for example, timely discharge), complications (for example, investing in patient safety initiatives), failure to rescue (for example, building rapid response teams), or appropriate discharge to avoid readmission.

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### ISQUIA16-2861

#### UNDERTAKING LARGE-SCALE RESEARCH IN AUSTRALIA: ENCOUNTERING THE COMPLEX WEB OF ETHICS AND GOVERNANCE IN HOSPITALS AND HEALTH SERVICES

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**Objectives:** The 'Deepening our Understanding of Quality in Australia' (DUQuA) study is a nation-wide Australian project investigating the relationship between how quality is enacted and patient outcomes across 60 of the largest public hospitals. DUQuA aims to examine associations between a) organisation and department level quality management systems, clinician leadership and culture, and b) clinical treatment processes, clinical outcomes, and patient reported perceptions of care for acute myocardial infarction, stroke and hip fracture within Australian hospitals [1]. Our presentation will detail the processes and challenges involved in obtaining ethics and governance approvals for this large and complex project. Onerous ethics processes and requirements for large-scale studies are of concern to researchers internationally: for the Deepening our Understanding of Quality improvement in Europe (DUQuE) multinational study, England was not included partly due to restrictive research ethics criteria and delays in obtaining approval [2].

**Methods:** 70 hospitals were approached and invited to participate in DUQuA, and 60 hospitals across the six states and two

territories of Australia were recruited. A local principal investigator was identified in each hospital, and the ethics application process commenced in early 2015. Although Australia has a National Ethics Application Form (NEAF), there is no single review process for health services research in Australia and separate ethics applications were required for each state and territory. For states that did not have a mutual acceptance policy in place, separate ethics applications were required to be submitted for each participating hospital. In addition to ethics approval, governance approval is required at each participating hospital to ensure that hospital resources are sufficient to enable the proposed research to be conducted. However, each governance application cannot be submitted until primary ethics approval has been obtained, and research at each hospital cannot commence until governance has been formally approved.

**Results:** Ten ethics applications were submitted to cover all participating hospitals. Both the ethics requirements, and the processes for submission of the application itself, differed between states, with some states allowing a 'low risk' abbreviated application and others requiring a full 'high risk' submission. Full ethics submissions were a large and complex undertaking; a hard copy of one of the submissions, for example, weighed nearly 7 kg. Governance applications required 46 Site Specific Assessment (SSA) application forms, 25 legal research agreements, and (for one state) an additional 12 Public Health Act applications.

**Conclusion:** Negotiating the complex web of ethics and governance added 18 months to the research timeline, and resulted in considerable additional expense. Ethics and governance processes should be streamlined by centralising systems, and clear and consistent requirements should be agreed between states in federated health systems. Having agreed requirements and processes for health services research would reduce wastage of time and funding, improve transparency of research and compliance with ethical processes, and facilitate multi-disciplinary, large-scale, world-class results.

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## ISQUAI6-1369

### NATIONAL GUIDELINES FOR SPIRITUAL CARE IN AGED CARE

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**Objectives:** In the absence of any specific guidelines for spiritual care in aged care, this project has developed guidelines to guide

providers on a person-centred approach to the spiritual care of older people living in residential care or in the community.

**Methods:** A literature review was conducted using search terms such as spiritual care, spirituality and aged care through CINAHL, Medline, Psych Info, AMED and 11,000 records were found. After de-duplication and review for relevance, 335 relevant documents were reviewed. There were many definitions of spirituality found, however Puchalski's *et al.* [1] definition was often cited. There is evidence linking effective spiritual care with positive health outcomes and well-being measures.

A stakeholder engagement strategy was used to consult with consumer groups, providers and interest groups. Views of older people and their representatives regarding spiritual care were obtained through 10 in depth qualitative interviews. 17 focus groups with 127 people were conducted with staff, management and volunteers to identify good practice. The common themes emerging from the interviews and focus groups were summarised into 17 principles reflecting good spiritual care practice. These statements were reproduced in an industry-wide survey with 726 respondents including consumers, family/carers, aged care providers, faith-representatives and volunteers. Overwhelmingly positive support was shown for the key principles identified.

An Expert Advisory Panel (EAP) of 30 people comprised of Australian and international experts then reviewed the draft Guidelines. The EAP provided feedback using a modified Delphi process through 4 surveys. After each survey, the Guidelines were further refined. The draft Guidelines were publicly released and feedback was obtained through a survey and submissions process. The draft Guidelines were then piloted with 17 sites over a six week period. Pilot sites were briefed, supported and debriefed. Pilot sites included a range of organisations: private for-profit, charitable and faith-based.

**Results:** The National Spiritual Care Guidelines for Aged Care have been developed to meet a gap in the provision of care to older people. Person-centred care principles of relationship, connectedness and focusing on the needs of the person are reflected in the Guidelines. The Guidelines recognise a diversity of faiths, beliefs, cultures including those with humanistic beliefs. The need for a whole-of-organisation approach to the provision of spiritual care was consistently raised in the fieldwork and literature. Following consultation with industry, the Guidelines include suggested strategies for implementation.

**Conclusion:** The Guidelines have been piloted and refined to ensure relevance and evidence-based practice. The Guidelines represent significant progress in person-centred care within social care contexts and provide an organisational approach to spiritual care. The Guidelines will be freely available on a website from July 2016 and could be easily adapted to other social care contexts including palliative care.

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### ISQUA16-1473 PATIENT-CENTRED MEASUREMENT OF EXPERIENCES AND OUTCOMES OF CARE IN BRITISH COLUMBIA, CANADA: STATISTICS WITHOUT THE TEARS WIPED OFF

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**Objectives:** To demonstrate how British Columbia (BC), Canada changed its standardized, scientifically rigorous, province-wide approach to measurement and reporting of patient-centred care to ensure data was used locally for quality improvement purposes and provincially to inform policy development.

**Methods:** BC's patient-centred measurement program gives those who use healthcare services a voice in improving the quality of the care they receive. BC has collected feedback for 13 years from over one million patients about their perceptions of our healthcare system. An underlying assumption of the program was that routine feedback provided to clinicians about the experiences of "their own" patients would drive improvements.

Interviews with key stakeholders explored success factors and barriers to using survey results. Although there was appreciation for methodologically robust data collection and reporting, clinicians and leaders did not want systematic translation of the voice of patients into "statistics with the tears wiped off". This seemed counter-intuitive to a program intended to increase patient-centredness. Cycles of tests of change engaged leaders, staff, and patients with the aim of developing patient-centred, user-friendly, easier to read, and more timely reports.

**Results:** Integrated quantitative and qualitative reports were developed through iterative tests of change to present narrative comments from real patients alongside numerical scores. A "human voice" or "patient story" is annotated directly into reports to illustrate the numerical scores. And, trends over time are interpreted by an analyst for questions with low scores and high correlation to patients' global ratings of satisfaction. The annotations also pose questions for local clinical teams to consider.

Reports are disseminated monthly, and used by leaders to facilitate discussion with clinicians to reflect on what their own patients

say about their care experiences, and to engage patients and families to support local quality improvement efforts. The narrative comments from patients trigger conversations among clinicians. It is the conversation that is transformative, rather than the data.

Increased attention to patient feedback collected across 13 sectors has resulted in a change in the focus of the provincial patient-centred measurement efforts in BC from sector based surveys to providing information to clinicians to support patients with more seamless transitions within and between sectors and providers. "Continuity across transitions in care" reflects a collaborative effort in BC between clinicians, researchers, policy makers and patients to address the goals of a patient experience of consistent, connected, coordinated care that includes relational continuity, informational continuity, and managerial continuity [Haggerty, 2003].

**Conclusion:** Patient stories have the emotional power to engage caregivers. Surveys conducted and reported in a scientifically rigorous manner with quantitative and qualitative data presented together have the emotive power to engage and enable caregivers to see the survey results as valid, reliable, and representative of the real, lived experiences of their patients. Support for analysis and interpretation of results serves to translate data into information that clinicians and policy makers can translate into action.

Quantitative and qualitative information from patients support our understanding of when, if, and how individual patient experiences and the experiences of populations of patients in BC affect their clinical outcomes, their engagement with their own health and their healthcare, as well as their health status and quality of life.

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### ISQUA16-2690 IMPROVING CARE AND CHOICE AS MOTOR NEURONE DISEASE PROGRESSES

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**Objectives:** The research built on a qualitative project conducted in 2012 around choices faced by people with Motor Neurone Disease (MND) at the end of their lives. The aim was to develop survey questions that could be asked of all people with MND about these choices to better understand the decisions and how ready people felt to be making them.

**Methods:** Questions were developed to capture feedback from people living with MND to understand their care and support needs as the disease progresses. This was achieved via the following methods:

- o Data from an existing questionnaire was statistically analysed to evaluate which questions were of most value in terms of providing actionable feedback.

- o Themes that had emerged from existing qualitative work into end of life care also informed the question areas.

Question areas included ease of talking about death and dying; choice at the end of life; and whether people living with MND would welcome a public debate on end of life issues. They were cognitively tested on people with MND to check for clarity and comprehension. These questions were added to an existing MND feedback questionnaire focussing on diagnosis and support needs, but included in a separate part of the survey, with a caveat warning respondents about the sensitive nature of the questions, with the option to skip them if preferred.

A total of 2,933 people with MND were sent a pre-approach opt-out letter. Following the response from the letter (67 deceased notifications and 28 opt outs), 2,838 were invited to complete the survey. A further 131 notifications (102 deceased and 29 opt outs) were received throughout fieldwork. A response rate of 34% (951) was achieved.

A mixed methodology approach was selected for implementing the survey. All contacts with an email address were sent an invitation, which contained a link to the online survey. The remaining sample who did not have a registered email address were sent a paper copy of the survey in the post. A reminder notification was sent two weeks after the initial invite to all non-responders

**Results:** The top five areas that people living with MND identified as needing more information and support in were:

- Information about end of life care options (42%, n = 222)
- Information about treatments to help the final stages be as peaceful and dignified as possible (40%, n = 210)
- Opportunity to discuss options for taking control at the end of life (33%, n = 173)
- Options around organ donation or donation to research (30%, n = 157)
- Information on how to talk about end of life issues with family members and friends (29%, n = 155)

**Conclusion:** A response rate of 34% (951) was achieved making this the largest survey of people with MND (in the UK) to date, providing detailed feedback on services and support, in addition to what is important to those living with the disease.

The research showed that people want to be able to talk about the choices they face at the end of their life but that in many cases they don't feel able to. Findings are being used in a number of ways, including:

- o Influencing policy change - a brief was provided to all MPs before the assisted dying debate in September 2015.
- o Informing on new National Institute for Health and Care Excellent guidelines for people with MND
- o The data is being used as evidence to ensure that providers assess and deliver services and equipment in a more anticipatory manner.

Informing an award winning end of life guide for people with MND to help families and health and social care professionals discuss end of life issues with more ease

## ISQUA16-1920

### USING A NEW PATIENT FEEDBACK SURVEY TO EXPLORE EXPERIENCES OF LIVING WITH SICKLE CELL DISEASE IN THE UK

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**Objectives:** To study the healthcare experiences of individuals living with a chronic blood disorder called Sickle Cell Disease (SCD) on a national scale, and to assess the validity of a disease- and age-specific patient experience survey tool for aiding the future delivery, design and commissioning of services.

**Methods:** Focus groups were arranged separately with adults, young people (aged 8–15) and parents of children with SCD to explore key aspects of their care experiences in the NHS. This informed the development of three questionnaires, with 33–38 questions each, by a team of care providers, user representatives and survey developers. Questionnaires covered aspects of routine and emergency care, in-patient and outpatient care, and provision of information and psychosocial support. They were cognitively tested and then piloted over a period of six months. Responses were collected either electronically or by face to face meetings.

**Results:** A total of 722 responses were obtained, exceeding 200 responses from each survey group of children aged 8–15, adults and parents of children with SCD. Validation assessments indicated that all questions functioned independently to contribute to the measurement of patient experience and no survey amendments were necessary.

The key survey findings included the perceived lack of clinical awareness about the condition among healthcare providers, especially in hospital-based emergency care. When asked whether care providers knew enough about SCD, over three quarters of respondents (78%) confirmed that this was 'definitely' true for planned specialist care providers. However, this fell to less than half (48%) for emergency care providers. Additionally, respondents alluded that in comparison to specialist staff, emergency staff were less sympathetic and understanding of their needs.

Respondents indicated that information about self-care was lacking, and only a third felt they were given adequate information about coping with pain, a significant clinical feature of SCD and the commonest reason for accessing emergency care. However, adults with SCD indicated that they preferred to self-manage their pain at home. Furthermore, only one in three respondents felt that the emergency staff provided timely pain relief treatment.

Respondents also indicated that there was a lack of awareness of the condition among the general public (86% of respondents felt that their friends did not know enough about SCD), and healthcare staff did not provide information about SCD to relatives, teachers and employers. Information about specific interventions for disease management was also lacking.

Care experience of adolescents and young adults were comparatively more negative than any other age group, and this covered almost all aspects of their care, including emergency, specialist and inpatient care.

**Conclusion:** This is the first ever survey of patient experience in SCD in the UK and has provided valuable insight into the care experience of a wide age range of patients. Future service development should focus on improving awareness of this condition among healthcare workers and the public and tailored care provision for adolescents and young adults should be prioritised.

## ISQUAI6-2431 HOW NATIONS COMPARE: BENCHMARKING USE OF INFORMATION TECHNOLOGY TO IMPROVE CARE

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**Objectives:** While health policies and priorities differ across countries, many nations have implemented strategies that aim to improve access to care, quality of health services, care coordination, and productivity within the health system through effective use of information technology (IT). Under the auspices of the OECD, this study piloted the collection of benchmark measures of health IT availability and use to facilitate cross-country learning.

**Methods:** A prior OECD-led effort involving 30 countries resulted in the selection and definition of functionality-based measures for availability and use of electronic health records, health information exchange, personal health records, and telehealth. For this pilot, an OECD working group compiled the results for some or all measures for 38 countries based on new and/or adapted surveys and other data sources from 2012 to 2015. The group then synthesized feedback from a subset of countries to identify key learnings.

**Results:** Electronic records are now widely used to store and manage patient information at the point of care. All but two pilot countries reported use by at least half of their primary care physicians; many had rates of 75% or more. However, there are important differences in the specific data and functions available (e.g. ability to produce lists of patients according to diagnosis or prescriptions), as well as in how frequently healthcare providers use electronic records. Patient information exchange across organizations/settings supporting continuity and coordination of care is less common. For example, a few countries (Canada, Estonia, Finland, Luxembourg, and Malta) reported universal or near universal ability of acute care facilities to exchange radiology results and/or images with outside organizations. However, only about a half (53% in 2012) of European acute care facilities reported this ability. A number of countries within and outside of Europe had much lower rates. Variations in the availability and use of telehealth and personal health records are also large.

**Conclusion:** Participation in the pilot demonstrated interest in cross-national benchmarking. Using the most comparable measures

available to-date, it also showed that there is substantial diversity in health ICT availability and use within and across benchmarking domains. By identifying such variation, benchmarking offers the potential to facilitate cross-national learning and accelerate the progress of individual countries and their efforts to improve care and outcomes for patients. The project also identified methodological considerations (e.g., structural and health systems issues that can affect measurement) that will need to be addressed in future comparisons.

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1. Contributors to this work included Jennifer Zelmer, Julia Adler-Milstein, Christiano Codagnone, Francisco Lupiáñez-Villanueva, Christian Nøhr, and other members of the OECD Health ICT Benchmarking Pilot Group.

## ISQUAI6-1862 A MOBILE DATA-DRIVEN SAFETY AND QUALITY SYSTEM FOR VOLUNTARY MEDICAL MALE CIRCUMCISION (VMMC) IN MOZAMBIQUE

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**Objectives:** To implement a mobile registry and monitoring system for safety, quality, and management of the PEPFAR-funded VMMC Program in Mozambique.

**Methods:** In 2009, the Mozambican Ministry of Health (MOH) started a VMMC program to circumcise 2 million men by 2018 as part of its HIV prevention strategy. Since then, Jhpiego, with support of CDC/PEPFAR, has collaborated with the MOH for the provision of nearly 450,000 circumcisions by December 2015. Demand for VMMC in Mozambique is markedly seasonal and varies among provinces and even districts and localities. Therefore, a significant part of the services is provided by mobile units and temporary sites. Managing and expanding such a large-scale program with attention to safety and quality presents many challenges, particularly if traditional management tools are used. To address this situation, Jhpiego developed a mobile, tablet-based, data-driven safety and quality system for VMMC consisting of four modules:

- Daily data on clients served in aggregate and by provider
- An electronic client record including procedures and complications
- Assessments of compliance with established standards of care
- Confirmation of > minimal stock of critical medical supplies

The system was developed starting in 2012 using Mobile Data Studio and Mobile Data Anywhere software for data capture and uploading and Excel for exporting data. The first two modules have been completed, the third one is being tested, and the fourth is being designed. Daily reports on clients and providers' production as well as the electronic client record started the same year 2012. Paper-based client records prior to 2012 were retrospectively entered in the system.

Data is entered daily at the site level and sent electronically to a central database. Where there is no connectivity the system stores data locally and synchronizes with the central database when connectivity is available. Data received centrally is shared daily via email, including summary data, tables, and graphs, with national and provincial Jhpiego VMMC program managers.

**Results:** Data analyzed daily by site include: number of clients by age, HIV status, and other demographic characteristics and number of procedures performed by individual providers by cadre. Electronic patient records are stored in the central database. Severe complications are reported immediately with inclusion of pictures that help to assess the case for potential referrals. Based on the information provided VMMC managers make prompt decisions on the most efficient location of mobile units, temporary sites, and providers, on better targeting of demand-generation activities, and on strengthening safety and quality by analyzing complication trends.

The successful operation of this mobile safety and quality system has helped the Jhpiego/Mozambique VMMC program to annually increase its production keeping a very low rate of complications. Procedures increased from 77,652 in 2012, to 99,942 in 2013, 106,052 in 2014, and 133,677 in 2015. The complication rate has been 0.3% of which only 1/10 were severe.

**Conclusion:** A real-time mobile system with integrated data on patients and providers production by facility helped to consistently expand the VMMC activities in Mozambique with a low rate of complications. Its success was facilitated not only by the timely flow of relevant information but also by its dissemination among key managers, and its use for daily decision-making. The system is simple in its design and operation. The addition of the two new modules being tested and designed will enhance even more the capabilities of the system and its usefulness.

#### ISQUAI6-1665 HOSPITAL INFORMATION TECHNOLOGY INFRASTRUCTURE AFFECTS QUALITY OF CARE

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**Objectives:** To investigate the association between hospital information technology (IT) infrastructure that facilitates the retrieval of evidence-based practice recommendations and hospital compliance to healthcare quality indicators (QIs).

**Methods:** A cross-sectional study was conducted on Japanese hospitals using survey data and administrative data. Firstly, a questionnaire survey as part of the Minds-QIP Project was conducted by mailing the administrators of hospitals participating in the Quality Indicator/Improvement Project (QIP). The survey was designed to reveal the hospital IT infrastructure and the attitudes of the

hospitals' leaders toward the usage of clinical practice guidelines. Hospital IT infrastructure was assessed according to the following three elements: (i) wireless local area network (LAN) availability, (ii) accessibility to charged medical evidence databases in English, and (iii) medical library usability, such as a well-organised intranet interface. Secondly, QIs were calculated using administrative data from the QIP. The QI of interest for this study was a composite score of the proportion of adherence to clinical practice guidelines for perioperative antibiotic prophylaxis, which was aggregated from the results of 11 different surgery types. Finally, we compared the composite score of adherence to clinical practice guidelines between the well-equipped hospitals (which fulfilled all three IT infrastructure elements) and the ill-equipped hospitals (which fulfilled none of the elements).

**Results:** Among the 239 hospitals that responded to the questionnaire survey (response rate: 57.2%), we were able to calculate and integrate the QI data with the survey data in 158 hospitals. The composite QI score was significantly higher in the well-equipped hospitals (84.7; 23 hospitals, 15,261 patients) than in the ill-equipped hospitals (64.2; 15 hospitals, 1,590 patients).

**Conclusion:** These findings indicate that hospitals with superior IT infrastructure may provide higher quality care. Hospital IT infrastructure (such as wireless LAN availability, accessibility to charged medical evidence databases, and medical library usability) enables medical staff to retrieve the latest information on evidence-based medicine, and is essential for the dissemination of clinical practice guidelines in the Internet era. Hospitals should focus on establishing adequate IT infrastructure in order to support the effective implementation of these guidelines.

#### ISQUAI6-2381 DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGY IN HEALTHCARE: SOCIODEMOGRAPHIC ASPECTS ON QUALITY AND SAFETY OF CARE

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**Objectives:** Digital information and communication technology (ICT) in healthcare is growing rapidly. The aim of the study is a quantitative evaluation of these technologies regarding the sociodemographic aspects on quality and safety of care out of the patients point of view.

**Methods:** The cross-sectional study was carried out through the administration of a questionnaire, addressed to 208 patients. The questionnaire composed of five parts: sociodemographic data, at present being used information- and communication systems in health care, internet usage patterns in general and for healthcare purposes, and the potentials of

eHealth for online patient-physician communication. All statistical analysis have been performed using *SPSS* Software (IBM Corp., NY, USA).

**Results:** 91,8% of the patients have a web-enabled computer and 78,8% are smartphone users. 78,4% of the patients use the internet for everyday life. Even if 79,8% of the patients did not know the term “eHealth”, 73,3% of them look online for health related information. 57,7% of all ages would use web-based appointment management and communication systems. 56,8% favor automated e-mail reminders and 57,7% text message based reminders for improving the show up rates. 61,0% would like to receive the medical reports by e-mail. No significant difference in gender could be shown for the attitude to eHealth.

Patients located in rural regions can image using mobile health applications with online data communication to physicians while patients in high populated regions are significantly reserved for such technologies (Chi-square test:  $p = 0,022$ ). Also a significant difference could be shown in the request on saving personal health data on an individual electronic health record. This potential of ICT is also more requested in rural regions (Chi-square test:  $p = 0,004$ ).

With focus on data security, 67,7% of the patients younger than 44 years have concerns in using ehealth applications, while only 32,3% older than 44 years have such concerns ( $p = 0,003$ ). Furthermore, 63,7% of the patients younger than 44 years would use a hospital app for directed information research prior the appointments and only 36,3% older than 44 years would use this service ( $p = 0,008$ ).

**Conclusion:** Modern information and communication technology (ICT) is predominantly accepted by the patients. Using this technology for healthcare purposes is highly influenced by sociodemographic aspects. Furthermore, the potentials of ehealth applications especially for intersectoral communication and information transfer seem to increase considerably. With the ongoing development of ICT in health care further studies should also focus on verification of data safety and data security.

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#### ISQUA16-2889

### THE POST-DISCHARGE LONG-TERM MORTALITY AND CARE BURDEN AMONG ELECTIVE SURGICAL PATIENTS WITH POSTOPERATIVE SEPSIS

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**Objectives:** Postoperative sepsis can develop multiple organ dysfunction and experience significantly greater mortality during their hospital stay. Even in those who are successfully treated and survival to discharge, prolonged risk of death can persist following discharge. Postoperative sepsis account for one third of all sepsis cases. However, the population-based epidemiology and magnitude of long-term survival outcomes of elective surgical patients following hospital discharge with postoperative sepsis remain unclear. In the current study, we aimed to investigate the magnitude of post-discharge mortality and its associated risk factors among the elective surgical patients with and without postoperative sepsis, using data from all public acute hospitals in the state of New South Wales (NSW), Australia.

**Methods:** All adult elective surgical admissions (> 18 years;  $n = 144,503$ ) who survived to discharge were identified in 82 public acute hospitals in the New South Wales (NSW) from 2007 to 2012, using the Admitted Patient Data Collection records linked with the NSW Registry of Births, Deaths, and Marriages. We assessed post discharge mortality rates of these patients at 30-, 60-, 90-day and one year among surgical patients with and without post-operative sepsis. To understand changes in 1-year mortality over time, we assessed crude linear trend for the outcome variables after excluding possible quadratic effect using the study year as a continuous variable using Poisson mixed models. Cumulative survival outcomes across non-sepsis and sepsis cohorts were estimated first by calculating Kaplan-Meier survival functions and log-rank tests to detect differences among the two cohorts at 1-year time interval after discharge, particularly the differences in age-, sex- and comorbidity-specific mortalities in the two cohorts. We then estimated the risk difference of death in 30-, 60-, 90-day and 1-year between the two cohorts using Cox proportional-hazard models to control for the other confounding factors. A  $p$ -value of 0.05 was considered as indicative of statistical significance and 95% confidence intervals (CIs) presented where appropriate.

**Results:** We found significantly reduced 1-year post discharge survival rate in patients with sepsis (86.5% versus 96.2% without sepsis;  $P < 0.001$  by log-rank). There was no significant difference of rate of 1-year post discharge mortality (1 in 7) over the 6-year study period. There were significant variations of age-, sex-, and comorbidity-specified survival curves. The average post-discharge mortality in 30-, 60-, 90-day and 1-year in sepsis cohort was, in turn, 4.6%, 6.7%, 8.1%, 13.5% (versus 0.7%, 1.2%, 1.5%, 3.8% in non-sepsis cohort, respectively). After adjusting for patient and hospital characteristics, the higher risk of death persisted in sepsis cohort (HR = 3.46, 95%CI: 2.77–4.32 for 30-day; HR = 3.19, 95%CI: 2.55–4.00 for 60-day; HR = 3.09, 95%CI: 2.51–3.80 for 90-day; HR = 2.27, 95%CI: 1.96–2.62 for 1-year). Older age (HR = 2.64, 95%CI: 1.15–6.05) and comorbidity (HR = 2.86, 95% CI: 2.08–3.92) were the only significant determinants of the increased risk 1-year post discharge death for septic patients.

**Conclusion:** Despite the reported decline of in-hospital severe sepsis case fatality, 1 in 7 post-discharge selective surgical patients with sepsis died within 1-year and such a rate persisted over the 6-



year study period. The first 30-day post discharge showed highest risk of mortality, the elderly and patients with comorbidity had higher risk of death. The increased health care cost and the complexity in providing coordinated (including end-of-life care) for these particular patients required further research and policy interventions.

### ISQUAI6-1953 GEODEMOGRAPHIC ASPECTS OF PRIMARY CARE ACCESS: THE CZECH REPUBLIC

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**Objectives:** Healthcare accessibility, not simply in terms of time, is a key indicator of the quality of healthcare. One potentially serious issue affecting healthcare accessibility is the age structure of physicians. Many European countries currently have top-heavy physician age structures. For instance, in the Czech Republic, primary care professionals (general physicians, paediatric general physicians, dentists and outpatient gynaecologists) tend to be either close to retirement age or at retirement age. Given that there are insufficient numbers of young physicians to replace older doctors, there is a real risk that basic healthcare accessibility will worsen within a relatively short space of time. Furthermore, under the legislation currently in place, equal access to healthcare cannot be guaranteed.

**Methods:** As yet there is no method that can be used to fully quantify healthcare access. This research uses Network Analyst, a GIS tool, to examine primary healthcare access. It also analyses the structure of the population and of physicians (and work capacity) within defined districts. It monitors a number of values (capacity, mean age, proportion of physicians at retirement age, etc.) in districts distinguished by type. The results are critically evaluated and considered in the light of how the legislation defines local accessibility.

**Results:** Government documents on ensuring healthcare accessibility in the Czech Republic often appear to suggest that primary healthcare access is problem-free and delivered to a high level. However, the methods of assessment used are very general and do not take account of variables that may affect accessibility in the near future. Geodemographic factors are one such category. The demographic structure of general practitioners is markedly regressive: a quarter of paediatric and adult general physicians are in the 55–59 age group, a third are aged 60 or over, while only 11% of general physicians are under 40 and only 4% of paediatric general practitioners. This means that the intergenerational replacement of physicians will become an issue. The problem is felt particularly among dentists (21% are aged 55–59, while 31% are aged 60+). Regionally, the situation is even less favourable – some regions are already experiencing acute problems and patients have difficulties registering with a doctor.

**Conclusion:** Using legislative measures, and working in tandem with health insurance companies, educational organisations and healthcare providers, the state should ensure the quality and accessibility of healthcare. However, this cannot be achieved without interconnected analyses that carefully monitor the structural variables, both now and in the future. If such wide-ranging analyses were available, it would be possible to avoid a potential situation in which accessibility to quality healthcare was at risk, primarily because of the unfavourable demographics already affecting physicians in many European countries. This is a potentially serious situation which cannot simply be resolved in a single step but requires a systematic conceptual approach involving collaboration between all stakeholders, including research units. This approach should at the very least help reduce the negative impacts associated with the changing rate of the intergenerational replacement of primary care physicians.

### ISQUAI6-1279 JOINING UP THE CONTINUUM FROM CANCER SERVICES TO FAMILY PRACTICE THROUGH IMPROVED COMMUNICATION

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**Objectives:** To increase the integration of primary care with specialist cancer services in a culturally diverse, lower socioeconomic status health district in southwest Sydney, Australia, by improving communication. The project was initiated in response to research identifying that letters from oncologists were taking up to three months to reach family doctors, who perceived this delay as wasting time and affecting their cancer patient care.

**Methods:** A previous survey revealed an average delay of 19 days from consultation to reading of letter (range 3 to 104 days). GPs thought a week was timely. An expert reference group including oncologists, GPs, GP practice staff, cancer administration staff, local primary care support staff and academics agreed on a target of 7 days from consultation to reading the letter and contributed ideas for change.

The group mapped the existing process across the continuum from consultation with the cancer specialist to reading of the letter by the GP. It agreed on a core measure of “transcription to approval” of letters, which could be extracted from the cancer services IT system. Base line data was extracted retrospectively.

A run chart recording fortnightly measure results was developed and circulated regularly. GPs were surveyed before and after the project to assess changes in timeliness and satisfaction.

A microteam of cancer staff and the project team from the GP academic unit met fortnightly to carry out rapid improvement

cycles. Each meeting re-examined the process map and designed changes to save time and simplify it. The improvement measures were reviewed fortnightly to assess the impact of changes.

The project was evaluated quantitatively through the improvement measures and qualitatively through interviews with cancer staff affected by the changes. GPs were surveyed before and after the project to assess the impact.

**Results:** Changes initially focussed on the dictation to approval process and included testing time and cost of the four existing transcription methods with a standard letter. One transcription method was found to be significantly cheaper and much faster and was adopted as the main strategy. Numerous other PDSA cycles were used to test simplifications of the process. Later in the project digital transmission of letters was explored to save time and money on postage.

Rapid improvement cycles reduced the time for producing letters from an average of 27 days to an average of 7 days. Significant improvement began before the microteam meetings began as administration staff reacted to the process map and began making changes. The letter delay measure was incorporated into the cancer services management dashboard to promote sustainability of the changes.

#### Conclusion

1. Rigorous qualitative research helped us identify a real and strategic integration problem (letter delay) with confidence.
2. Developing the process map promoted buy across the continuum. The complexity of the map convinced stakeholders change was required. Referring to the map helped identify change ideas to test.
3. Rapid improvement cycles developed relationships between project team members across the care continuum and enabled testing of changes prior to wider implementation.
4. Sustainability was promoted by making the delay measure part of the cancer services management dashboard.

### ISQUAI6-1909

#### THE AFTERMATH OF MEDICAL ERRORS: SUPPORTING OUR SECOND VICTIM COLLEAGUES

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**Objectives:** Second victims are healthcare workers who experience emotional distress following patient adverse events. Studies indicate the need to develop organizational support programs for these workers. The RISE (Resilience In Stressful Events) program was developed at Johns Hopkins Hospital to provide this support. To describe development of RISE and evaluate its initial feasibility. Program phases included: 1) Developing the RISE Program 2) Recruiting and training peer responders, 3) Pilot launch in the Department of Pediatrics, and 4) Hospital-wide launch.

**Methods:** Mixed-methods study, including description of RISE, staff surveys, and evaluations by RISE peer responders. Descriptive statistics were used to summarize demographic characteristics and proportions of responses to categorical, Likert, and ordinal scales. Qualitative analysis and coding were used to analyze open-ended responses from questionnaires and focus groups.

**Results:** A general staff survey at baseline found that most staff had experienced an unanticipated adverse event, and most would prefer peer support. A total of 24 calls, involving approximately 100 individuals, were received in the first 29 months. Eighty eight percent of the peer responders reported that the interaction with callers was successful and 83.3% reported meeting the caller's needs. Peer responders desired additional training to increase their competence and confidence in responding to second victims.

**Conclusion:** Hospital staff identified the need for a multidisciplinary peer support program for second victims. Peer responders reported success in responding to calls. The low initial volume of calls suggests a need to increase awareness of the program. Additional training should be provided to peer responders.

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### ISQUAI6-2863

#### ASSESSING THE LONGITUDINAL IMPACT OF SAFETY AND QUALITY REFORMS: AN ANALYSIS OF THE ACHS PILOT ACCREDITATION PROGRAM IN HONG KONG

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**Objectives:** Wide scale system reform is a significant undertaking requiring long term vision and commitment. As part of quality and safety reforms in Hong Kong an accreditation program was piloted. The study aim was to investigate the impact of the accreditation program on the Hong Kong pilot hospitals, individually and collectively.

**Methods:** Secondary data analysis of accreditation data collected across 2009–2014 by the Australian Council on Healthcare Standards was undertaken. ACHS used the Evaluation and Quality Improvement Program (EQuIP), versions 4 and 5. Data were drawn from: a 2009 initial gap analysis; a 2010 organisational wide survey; a 2012 periodic review survey; and a 2014 organisational wide survey. There were eight pilot hospitals, comprising five public and three private institutions. Survey recommendation ratings from seven criteria, from across the three function areas that were identified as challenging at the 2009 gap analysis, were longitudinally examined: Clinical function – consumers are provided with high quality care through appropriate consent processes (1.1.3) and health records (1.1.8), and the organisation provides safe care and services, infection control (1.5.2); Support function – management of corporate and clinical risks, via quality improvement system (2.1.1) and risk management (2.1.2); and, Corporate function – appropriate and effective systems for credentialing (3.1.3) and external service providers (3.1.4).

**Results:** Each of the eight organisations achieved and maintained accreditation status across the two cycles – 2010/2012 and 2014. However, outcomes for the seven criteria improvement varied over time and were different across the public or private groupings.

For five of the seven criteria, all organisations demonstrated significant improvement, which was sustained over the two survey cycles. Criteria which related to administrative or bureaucratic functions, for example credentialing or external provider systems, improvement appears to have been achievable, widespread and sustained. Conversely, criteria associated with clinical care matters, for example consent or infection control, shifting practices has been slower, uneven and yet to be sustained. Across all organisations, for example, there was marked and sustained improvement against the quality improvement system criteria (2.1.1); from the second assessment, most hospitals did not receive recommendations and by the 2014 assessment no hospital received recommendations. By way of contrast, Consent (1.1.3) was one exception whereby only two organisations were reported as have sustained improvement by 2014. The other exception was infection control (1.5.2), where all hospitals but one continued to receive recommendations to cease outdated practices and implement new systems at the last assessment.

Common challenges were identified across all organisations, for example, the use of abbreviations emerged as an issue, for both the consent (1.1.3) and health records (1.1.8) criteria. The system wide solution, which came from the regional authority, was a policy directive applied to all hospitals. All organisations were noted to improve across the two cycles, with the three private hospitals recording improvements at a quicker rate than their five public counterparts.

**Conclusion:** A positive longitudinal impact of the ACHS accreditation program on the Hong Kong pilot hospitals was identified. The system wide approach to the analysis allowed identification of

common challenges and system responses at specific moments and also across time.

## ISQUA16-2955 HOME TELEMONITORING FOR AGED CARE – DO THE ELDERLY COMPLY AND COMPLETE?

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**Objectives:** Telehealth services such as home telemonitoring have been reported to improve the management of chronic disease and hence reduce unscheduled admissions to emergency departments and length of stay when admitted to hospitals. The effectiveness of telemonitoring, however, may depend on patients' ability to adhere to schedules of home monitoring and case management. This paper explores how well the elderly comply with monitoring schedules and which factors influence successful completion of a program. We draw on results from the 'Telehealth Home Monitoring for Aged Care' project, Australia's first multi-state, multi-site clinical trial of home-based telehealth services for managing chronic disease in the community [1].

**Methods:** Patient selection to this trial was based on frequency of admission to hospital for a range of chronic conditions to reflect the population health realities of the healthcare system. Eligibility included those who were 50 years and over, and who had a diagnosis of one or more of the following chronic conditions: Chronic Obstructive Pulmonary Disease, Coronary Artery Disease, Hypertensive Disease, Congestive Heart Failure, Diabetes and Asthma. The study was designed as a dichotomous, prospective, case matched before-after-control-impact (BACI) trial at each of five sites. Test patients were supplied with an in-home telemonitoring system for both capturing daily vital sign measurements, and completing online questionnaires. Patient compliance with their monitoring schedule was calculated by comparing the total number of scheduled events with the actual number completed. Reasons for individuals not completing the trial were analysed and tabulated.

**Results:** In May 2013 we commenced recruitment of 114 Test patients (71.1 ± 9.3 years; 64% male) and 173 Control patients (71.9 ± 9.4 years; 56% male). The trial ran up to Dec 2014. Test patients were monitored on average for 276 days, with no significant difference between average monitoring durations for female patients (266 days) and male patients (281 days). 75% of all Test patients were monitored for periods exceeding 6 months. Compliance with the measurement protocols scheduled for each patient was generally high with patients carrying out their scheduled measurements and questionnaires at least once every two days. A strong correlation was found between the level of involvement of their clinical care coordinators and patient compliance. The main reason leading to cessation of monitoring and ultimately

withdrawal before completion of the trial included deterioration in health; stress; relocation; and feeling no benefit from the intervention. There was no correlation between age and withdrawal.

**Conclusion:** Our trial has demonstrated high compliance and completion rates with home telemonitoring, independent of age and gender, suggesting that this could be an appropriate approach for chronic disease management for a large population. Close involvement of clinical carers gives the greatest benefit to patient compliance. Deterioration in health proved to be one of the most noticeable reasons for withdrawing from the trial, suggesting that in clinical practice early detection of declining health should prompt reassessment of patient suitability.

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#### ISQUAI6-2364

### ASSESSING THE PILLARS OF LIFE QUALITY FOR LONG-TERM CARE CLIENTS IN RESIDENTIAL AND COMMUNITY CONTEXTS

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**Objectives:** The goal of this research was to validate a scale for assessing 9 life quality indicators for long-term care clients with and without dementia, across ages and genders and with all types of chronic illness or disability in both residential and community care contexts. The basic elements of the assessment cover social capacity, self-efficacy, relationships, mood state and feelings of security. The Long-Term Care quality of life (LTC-QoL) scale fills a gap in reliable quality of life assessments in such contexts.

**Methods:** The scale was developed and refined over 7 years by researchers and expert clinicians engaged in using it. Analysis of data from repeated LTC-QoL data for 62 residential care and subsequently 108 long term community care clients. Convergent validity achieved through comparison of World Health Organisation Quality of Life scale (WHO-BREF) run concurrently with the community care cohort LTC-QoL assessments. Residential care surveys occurred twice, 3 months apart. Community care surveys and WHO-BREF were administered at four time points: On admission; one week later; three months from initial survey; and three months plus one week from initial survey. Analyses of reliability, internal consistency and validity were completed for both residential and community care clients. No cases were excluded on the basis of age, gender, culture, language, cognitive capacity, physical ability, or disease. All participants had at least 2-3 chronic conditions.

**Results:** Exploratory factor analysis of nine items revealed high internal consistency (79% of the variance), good test-retest reliability (96–100% of residential care cases and 83% of community care cases within the 95% confidence interval for normal distribution). Cronbach's alpha of 0.88 found for all residential care cases and

0.76 for community care cases. Validity across age, gender, and cognitive capacity of residential care participants shows no differences between males and females ( $P = 0.77$ ,  $t = -0.2989$ ,  $df = 55$ ); and no differences in results between those with or without dementia ( $P = 0.75$ ,  $t = -0.3149$ ,  $df = 48$ ). Significant pair-wise correlation was found between LTC-QoL and WHO-BREF scores for the community care cases.

**Conclusion:** Results establish the LTC-QoL as having good Test-Retest reliability and dimensionality. Content validity and management utility were verified by clinical experts over time. While the Internal Consistency of the LTC-QoL for community care is lower it remains within the acceptable psychometric range. The scale is an easy to use single page form, generating summary information on the life quality experienced by adults in care, and indicating aspects requiring attention from care personnel. It also provides management information on individual and care unit outcomes in supporting the social, self-efficacy, relational, mood and security pillars that, when robust, build potential for those in long-term care to experience a reasonable quality of life.

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#### ISQUAI6-3191

### WHAT CAN BE LEARNED FROM THE IMPLEMENTATION OF A PAY FOR PERFORMANCE PROGRAMME?

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**Objectives:** In France, quality indicators have been compulsory for acute care hospitals since 2008. After a decade of public reporting, the context was favorable to the introduction of a pay for performance scheme. Indeed, the French hospitals financing model, based on DRGs, has not been taking quality into account. A financial incentive based on results on quality dimensions could be a tool to promote quality of care.

**Methods:** A research program named IFAQ was launched in 2012. The steering committee was co-chaired by the Ministry of health and the French National Authority for Health. A working group was set up, with experts appointed by hospital representatives, to specify the model. An independent research team was selected to act as scientific advisor. The objective was to develop a national P4P program (metrics, incentive model and incentive size), to evaluate its effects and the appropriation by the professionals.

The Ministry of Health launched a call for application in June 2012. Out of 450 hospitals, a panel of 222 hospitals was randomly

selected for the first experimentation which ended in December 2014. A second call for application was launched in June 2014 and 490 hospitals were included in the second phase which ended in December 2015.

The guiding principles of the program were to develop a composite score able to discriminate hospitals, to reward both achievement and improvement in quality, to ensure consistency with other policies regarding quality of care, to limit the workload for the hospitals, and to use only positive incentive without financial penalty. Furthermore, financial incentive was conditional upon the accreditation results (minimal level) and upon the collection of needed data to calculate quality indicators

**Results:** The lessons learned from experimentation are : first, the relatively small size of financial incentive was however a powerful argument and generate interest; second, the score had a good discriminative power even if for a few small hospitals it was questionable because of unavailability of some indicators ; third, when using a single composite score, it is difficult to individualize the contribution of achievement and improvement in the final score; finally, the calculation formula was too complex to be easily communicated and to permit teams to take this challenge on board

As a result, the final model links incentive payments to 52 nationally defined compulsory measures addressing process of care, including compliance with clinical guidelines for specific diseases such as myocardial infarction, level of computerization and patient experience. The weights have been revised and range from 1 to 3. Two composite scores are calculated for every eligible hospital: one for the achievement score and the other on improvement. Hospitals are ranked and the top performers (first two deciles) for each score are rewarded. The financial reward is a function of the rank and the hospital budget. Hospitals could potentially earn a maximum of 1.2% of their annual DRGs based payments by the health insurance funds.

**Conclusion:** This type of program was considered by all stakeholders as a model of co-management which led to a better acceptability and to an easier implementation. The 2015 Social Security Finance act enacted the extension of this quality incentive model to every acute care hospital in 2016. One third of them are expected to receive a financial reward in December for a total amounting to 40 million Euros

### ISQUAI6-2096 PERSON- AND FAMILY CENTRED CRISIS ASSESSMENT AND HOME TREATMENT SERVICES IN MENTAL HEALTH CARE

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**Objectives:** The overall aim was to test if the Australian developed model Crisis Assessment and Treatment (CAT) services was

applicable in Denmark (Mental Health Centre Frederiksberg) and to evaluate if it could increase efficiency as well as ensure patient centered care (PPC) monitored as:

- Patients retain a greater feeling of familiarity, security and autonomy during treatment.
- Reduction of family burden and a more satisfactory form of care for both patients and families.
- Patients are spared the stigma of psychiatric hospital admission and patients are less likely to become institutionalised.
- Resources in mental health care can be distributed more effectively.

**Methods:** A consumer represented task force chose to adopt an Australian model with triage by telephone, crisis assessment, gate-keeping and home treatment up to 6 weeks in a major city mental health service. Following a visit to observe Australian CAT teams at work, the group liaised with domestic prehospital services and adapted the Australian model completely to Danish conditions.

Patient satisfaction measured by tablets at home is introduced. Hospital admission rates prospectively and retrospectively are compared.

**Results:** Data collection is ongoing and the final results will be announced publicly for the first time at the conference. Preliminary results indicates a clear reduction in bed days, which means more staff available for hometreatment and thereby give the opportunity of a more satisfactory form of care for both patients and families.

**Conclusion:** Hospital admission rates are reduced significantly. Patient satisfaction is being explored. Patient centered care is optimized in a broader context and should be implemented widely in the mental health service reducing the need of emergency units and beds.

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### ISQUAI6-1531 LONGITUDINAL ADHERENCE TO A NATIONAL SCREENING PROGRAM FOR EARLY DETECTION OF COLORECTAL CANCER IN ISRAEL

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**Objectives:** In Israel, Ministry of Health Guidelines recommend annual screening with fecal occult blood testing (FOBT) for early detection of colorectal cancer (CRC) in adults aged 50-74 years. The National Quality Indicators in Community Healthcare program (QICH) measures yearly compliance with CRC screening

guidelines, using data from electronic medical records. QICH data cover virtually the entire civilian population in Israel, insured in one of four health maintenance organizations (HMOs). Apart from yearly FOBT, screening colonoscopy every 10 years is also considered adequate screening. We aimed to assess longitudinal adherence to screening guidelines by a) measuring the number of FOBT or colonoscopy exams in the target population during 5 years of follow-up and b) evaluating characteristics associated with non-adherence or incomplete adherence.

**Methods:** The study population included all Israelis insured by HMOs aged 50-70 at the time of enrollment on 01/01/2008, excluding individuals with colon cancer diagnosed prior to the study period. We measured the number of FOB tests performed until 31/12/2012. We then explored demographic, health and behavioral characteristics associated with non-adherence or partial adherence. Finally, a multivariable model was constructed in which the outcome variables were 1) any adherence (versus non-performance of FOBT in the entire study period or colonoscopy in the past 10 years) and 2) full adherence (FOBT done every year for 5 years or colonoscopy in the past 10 years).

**Results:** Thirty percent of 1,298,698 eligible Israelis did not perform a single screening test during the study period. Variables associated with non-adherence (odds ratios >1,  $p < 0.001$ ) included age 50-59 compared to 60-70 years, male sex, exemption from co-payments (indicating lower socioeconomic status), obesity, and nonperformance of other screening tests (such as mammography or PSA). In contrast, patients with a diagnosis of hypertension or diabetes were more likely to undergo screening for colorectal cancer at least once.

As for full adherence, only 25% of the target population performed FOBT every year during the study period (or colonoscopy in the past 10 years). Complete adherence was more likely to be due to performance of colonoscopy in the 10 years prior to measurement, and not to consistent yearly FOBT, which was in fact performed by only 4% of the eligible Israeli population. Factors associated with incomplete adherence were similar to those mentioned above for non-adherence except for diabetes, which was associated with poorer longitudinal compliance.

**Conclusion:** The study results indicate important gaps in longitudinal adherence to CRC screening. Despite the steady improvement in the overall percentage of Israelis who carry out a screening test in individual years (up to 57% in 2013), a substantial proportion (30%) does not take part in any CRC screening, and the probability that an individual will consistently perform FOBT every year for five years is very low (4%). Quality indicators need to take into account longitudinal measures of performance since cross-sectional measures fail to identify risk groups who never comply with screening guidelines. Efforts to improve the consistent participation and perseverance in screening programs are required in order to substantially influence CRC mortality.

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#### ISQUA16-2683

### IMPROVING THE QUALITY AND SAFETY OF THE CONSULTATION AND REFERRAL PROCESS: IT'S MORE THAN PROFESSIONALISM AND COLLEGIALLY

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**Objectives:** Quality Referral Evolution (QuRE) is a collaborative initiative to make education and support for quality consultation/referral education part of the postgraduate residency training programs in Alberta. QuRE is organized as well for accredited self-study for practicing physicians and surgeons in the province. The QuRE program intends to improve the quality of communications in *both* the request and response to the consultation/referral process. The provision of better and timelier access to care for Albertans coupled with enhanced and more effective interdisciplinary communication will increase the quality and safety of health services. The QuRE Working Group was established with representatives from Alberta Health Services (AHS), the University of Calgary and the University of Alberta. AHS is the single health authority for the Province of Alberta. AHS delivers medical care on behalf the Government of Alberta's Ministry of Health through 400 facilities (hospitals, clinics, continuing care/mental health facilities and community health sites). Family practice/primary care services are delivered through a network of 43 Primary Care Networks (PCNs) and non-PCN family physicians.

**Methods:** The QuRE Working Group, established in 2015, undertook and completed a comprehensive literature review, identified key components of a quality referral request and that of a quality referral response (or consult note). A two-sided checklist card was developed with suggestions for the requesting physician and the responding physician/surgeon. The QuRE card was trialed and tested by respective practices and modified based on feedback. Based on feedback it has had two (2) revisions.

**Results:** The literature review revealed that most papers focussed on the expectations or quality inclusion criteria in primarily written communication by either requesting physicians' or in consulting physicians' responses, but seldom in both. In addition there were few published studies addressing formal education and training in the consultation and referral process, and none of the approaches described addressed the training and assessment of referral *and* consultative communication processes together *nor* in multiple disciplines. To date, the QuRE card has been trialed by family physicians and consultant specialists alike. It has been the focus of workshops and scientific presentation in Alberta and across Canada. The literature review has informed our educational presentations, processes and products and penetrated resident modules and associated enduring educational materials. These include

case-based worksheets, video presentations, and a pocket consultation checklist for guidance, assessment or evaluation. Over 1800 **QuRE** pocket guides have been distributed to postgraduate residents/registrars and practicing physicians/surgeons.

**Conclusion:** Citizens of all countries should expect their health professionals to be highly skilled in essential communication skills needed in health services delivery. Undergraduate and postgraduate health professions schools need to promote formal multi-disciplinary approaches, such as our **QuRE** program, to provide work-based training and assessment for the important communication skills that are essential for safe, high-quality referral and consultation processes. These approaches should stress the shared principles and processes of communication for both the requesting and responding health professional.

### ISQUIA16-1363

#### UTILIZING ELECTRONIC HEALTH RECORD DOCUMENTATION TO MEASURE VALUE FOR PROSTATE CANCER CLINICAL CARE

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**Objectives:** The increased adoption of electronic health records (EHRs) opens a new data source to facilitate the systematic, comprehensive assessment of quality metrics. However, barriers to generate quality evidence and value from EHRs are well known, such as organizing the data to facilitate research and extracting knowledge from free text. The aim of this project was to develop an EHR prostate cancer database linked to the state cancer registry and develop standardized electronic representations of quality metrics to aid in the extraction of knowledge from EHRs.

**Methods:** We use ICD-9-CM diagnosis codes to identify prostate cancer patients receiving care at a large academic medical center. Patients are confirmed in the California Cancer Registry, which returns tumor characteristic and treatment data on all patients with a confirmed cancer diagnosis, including complete historical record of disease pathology (tumor staging). Using all proposed prostate cancer quality metrics, we define each quality metric using target terms and concepts to extract from the EHRs. These terms may include diagnostic procedures and tests and their results (such as Digital Rectal Exam, DRE), therapeutic procedures, and drugs (both ordered and administered). Terms are mapped to a standardized medical vocabulary, enabling us to represent the elements of a metric by a concept domain and its permissible values. The structured representation of the quality metric data elements are used to create quality *phenotypes*, which are rules involving the temporal order of components of the quality metrics.

**Results:** We identified 2,542 patients who sought treatment for prostate cancer at our academic medical center between 2006-2013. We have developed an EHR database that draws healthcare records from an academic center and link these records to the California Cancer Registry. This allows for clinical care data to be analyzed alongside diagnostic details, which are not usually

captured in EHR. This database includes unstructured clinician notes to ensure the broad evaluation of patient-centered data. Furthermore, our system enables real-time extraction of treatment processes and outcome measures, allowing us to use EHR data to track process improvements. The quality metric phenotypes we create are standardized code that can be used across different EHR systems. For example, the algorithm to detect DRE documentation contains prostate cancer diagnosis code (ICD-9 185), dates (ensure the DRE was performed prior to treatment), and textual concepts (e.g. DRE, digital rectal exam, and rectal exam). We also negate terms, to ensure mentions such as 'DRE deferred' are appropriately categorized.

**Conclusion:** EHR-systems can be used to assess and report quality metrics systematically, efficiently, and with high accuracy. The development of such systems moves the quality assessment field into large-scale analyses. Governments are investing in incentives for EHR adoption and meaningful use of data; policy-makers and healthcare workers can achieve EHR meaningful use by measuring quality healthcare delivery using standardized representations or *quality phenotypes*.

### ISQUIA16-2322

#### PRACTICE-DRIVEN RESEARCH IN AGED CARE NURSING

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#### Objectives

1. to overcome research implementation to practice issues in aged care
2. to promote research involvement of aged care clinicians
3. to achieve better practice in management and clinical services

**Methods:** The approach taken at a large retirement village in Sydney calls for the sensible use of evidence based practice (EBP) combined with what we have developed and termed 'practice-driven research' (PDR) ©. This approach recognises the expertise and experience of practitioners who daily undertake problem-solving and implement innovative approaches with observable results. PDR at RSL LifeCare begins with identifying an issue or practice that warrants further exploration leading to change in practise if necessary.

**Results:** Nine PDR projects since 2005 were initiated by practising nurses and care staff who maintained close involvement throughout the processes of investigation, analysis, practice development and implementation and outcomes evaluation. These projects are: Quality of life and physical capacity links; Ensuring pleasant dining experiences for residents with dementia; Enabling resident access to mental health care, treatment and support; Model of contemporary practise for aged care registered nurses; Strategy for overcoming staff concerns when caring for people with severe dementia; Establishing a system of specialised care for residents with healing difficulties. Of these, five received national awards as exemplars of best practice in aged care.

**Conclusion:** The design of PDR is a continual loop between practice and research that is ongoing and evolving. Clinicians and managers are closely involved with judging the efficacy of evidence from published research that they have integrated into their care of residents, as well as raising research questions relevant to the local context. The strength of PDR is that staff directly involved with projects remain involved in the research generated from their questions.

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#### ISQUA16-2662

### WILLINGNESS TO USE INTERNET-BASED CHANNELS TO COMMUNICATE WITH DOCTORS AMONG CITIZENS IN SPAIN

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**Objectives:** To analyze the characteristics (age, gender, educational level, population density, professional status, chronicity, subjective health status, acceptability of IT technologies in healthcare, etc.) that affect the predisposition of Spanish citizens to use Internet-based communication channels (E-mail, blogs, social networks, and online recommendations) to communicate and/or to interact with doctors.

**Methods:** Data from a nationally representative survey of the Spanish population between 16 and 85 years old who use frequently the Internet (July 2011) were used. Name of the Survey: "Use and Applications of Information and Communications Technology in Health" (ONTSI, Spanish National Observatory for the Technology and the Information Society). (N=5505; final analytical simple once missing data were excluded N=3405). Analytical Technique: Boosted Regression Trees analysis (BRT). BRT is a machine learning technique for regression and classification problems. This quite new statistical technique has been demonstrated as a more robust way to predict events in many disciplines, including medicine, biology and geology, comparing to other probabilistic and wider spread techniques such as Generalized Linear Models. This study is one of the first studies in the world using BRT for analyzing survey data.

**Results:** The BRT model achieved different degrees of predictive precision (using the Area Under the Curve as a goodness of fit measure) through the set of independent variables for each of the communication channels: for the willingness to use e-mail to communicate with his/her doctor, the Area Under the Curve (AUC) = 0.79; for the desire of his/her doctor has a blog or personal website, AUC = 0.736; for the willingness to use social networks to communicate with his/her doctor, AUC = 0.73; for the desire his/

her doctor provides recommendations of websites related to health problems, AUC = 0.768. Being young was the most important predictive characteristic to predict the willingness to use social networks (Relative Influence; RI = 21.05%), while population density was the most important predictor in desiring his/her doctor has a blog or personal website (RI = 19.48%). Having a positive perception of the doctor's use of technology during the appointment was the most important predictor for the willingness to receive recommendations on health-related Internet resources (RI = 18.66%), while having a high educational level was the best predictor for the willingness to use e-mail to communicate with his/her doctor RI = 18.98%).

**Conclusion:** Majority of Spanish population who use internet frequently is open to use physician-patient Internet-based interaction channels. Nonetheless, the main predictors vary significantly from one channel to another. In order to carry out a successful patient-centered plan to improve patient-doctor interactions, many of these characteristics should be take into account. Thus, the study provides useful resources for policy makers and doctors to decide which kind of Internet-based channel should be implemented first according to their patients' characteristics and most likely preferences.

#### ISQUA16-1699

### THE EFFECT OF COMMUNITY PSYCHIATRIC REHABILITATION INSTITUTION ACCREDITATION IN TAIWAN

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**Objectives:** In order to popularize the mental health model into community, Taiwan government supervised the service quality of community psychiatric rehabilitation institutions by evaluating it routinely. This study determined the effect for improving the quality of psychiatric rehabilitation institutions in psychiatric rehabilitation institution accreditation program in Taiwan.

**Methods:** The samples were collected from 2010 to 2015 among the 239 legal psychiatric rehabilitation institutions which had been surveyed by MOHW in Taiwan. Those institutions only had been surveyed once were excluded, then a total of 130 institutions were included in this study. Every institution had two scores. The first round scores were collected from 2010 to 2012 and the second round scores were collected from 2013 to 2015. After standardized the full scale of the two rounds' scores, we used paired t-test ( $\alpha = 0.05$ ) to analyze the difference between the first scores and the second scores of accreditation. Therefore, it could assess the effect for improving the service quality of psychiatric rehabilitation institution accreditation program.

**Results:** The first round scores were  $72.76 \pm 7.51$  points of full scale (108 points). The second round scores were  $75.10 \pm 8.79$  points of the same full scale. In table 1-1, it was significance that the second round scores were higher than the first round scores



( $p = 0.004$ ). Furthermore, we classified these institutions into two groups according to the average of their first round scores and analyzed again by groups. The group that scores higher than average in the first round had 0.57 point decreased in the second round. The group that scores lower than average in the first round had 4.77 point increased in the second round. Table 1-2 showed the statistic results of these two groups. There was significant advance in the lower scores group but higher scores group was not. Overall, we observed a positive quality promotion with all of psychiatric rehabilitation institutions especially in those first scores lower than average after they accepted the accreditation again. However, it might be a marginal effect existed in the accreditation and restricted the score increased for those better institutions.

**Table 1:** Statistic result.

1-1: Result of two round scores in accreditation (n=130)			
	Mean	S.D.	p-value
First score	72.76	7.51	0.004
Second score	75.10	8.79	
1-2: Secondary analyzed between the first score higher and lower than average groups.			
	First score Mean $\pm$ S.D.	Second score Mean $\pm$ S.D.	p-value
First scores higher than average (n=59)	79.22 $\pm$ 5.62	78.65 $\pm$ 7.61	0.598
First scores lower than average (n=71)	67.38 $\pm$ 3.66	72.15 $\pm$ 8.65	<0.001

**Conclusion:** In this study, these psychiatric rehabilitation institutions could get better performance certainly by using an accreditation. JCT will provide the results to MOHW for reference when the relevant policy will be needed. We also suggest that the standards can be revised in the future and lead psychiatric rehabilitation institutions to provide continuous and complete service to the patients.

## ISQUA16-1995

### A TALE OF TWO EVALUATIONS: THE QUALITY ACCOUNT AND THE ACCREDITATION SURVEY

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**Objectives:** The accreditation process of french health care organisations has been based on a combination of self-assessment by hospitals and accreditation survey conducted by surveyors, both making use of the same evaluation criteria. Self-assessment and on-site surveys were therefore based on very similar principles, and self-assessment was considered primarily as a reflective practice to be compared to external assessment.

In an effort to improve evaluation mechanisms, the V2014 process replaces self-assessment with the logging of a Quality Account, which serves, as an everyday working resource, to

determine the priority actions program for hospitals, based on the identification and prioritization of risks. This new method of assessment is less normalized than self-assessment which was supported by a quality repository. Moreover, the objectives of the V2014 on-site survey have also evolved to incorporate risk management as well as assessing compliance with the criteria of the quality repository. This has thus improved the hospitals' involvement in their own risk management evaluation.

This study aims at presenting these two new evaluation methods and how they can interact to reinforce the accreditation process.

**Methods:** A first study was conducted in 2014 to define criteria for assessing risk control framework through the reading of a Quality Account. Based on these criteria, a sample of quality accounts was then analyzed in 2015. We then defined how the content of a Quality Account could be used to answer specific elements investigated during the accreditation survey, thus complementing the evaluation process.

**Results:** The table below shows the results of the analysis of Quality Accounts samples received by the HAS during 2015.

Area evaluated	(Number of satisfied criteria/Total number of criteria)*100	Strengths	Areas for improvement
<b>Data mobilization</b>	30%		<ul style="list-style-type: none"> <li>– Results analysis of indicators/evaluations</li> <li>– Use of indicators to follow the action plans</li> </ul>
<b>Risk identification</b>	47%	<ul style="list-style-type: none"> <li>– Risks-based approach suits to HCOs</li> <li>– Description of control devices</li> </ul>	<ul style="list-style-type: none"> <li>– Reasons for the choice of the risk</li> <li>– Risk identification related to management process</li> </ul>
<b>Description of action plans</b>	70%	<ul style="list-style-type: none"> <li>Coherent actions with identified risks</li> </ul>	<ul style="list-style-type: none"> <li>– Monitoring modalities</li> <li>– The operational aspect of the action plans</li> </ul>

**Conclusion:** This analysis highlights potential areas for improvement, including the identification of most relevant data, the implementation of their day-to-day collection in hospitals, and how they justify their priority actions through the identification of risks. By developing these dimensions, hospitals can provide key answers during accreditation surveys, through their Quality Account. Several headings benefitting from this approach have already been identified, such as: “definition of the strategy”, “workflow evaluation” and “implementation of improvement actions and communication of results”.

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#### ISQUA16-3059

### HEALTH INFORMATION EXCHANGE SYSTEMS AND LENGTH OF STAY IN READMISSIONS TO A DIFFERENT HOSPITAL

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**Objectives:** To examine whether length of readmission stay (LORS) differs between same-hospital readmissions and different

hospital readmissions (DHRs), and whether in DHRs the LORS differs by the availability of health information exchange (HIE).

**Methods:** A retrospective cohort study of all internal medicine 30-day readmissions in 27 Israeli hospitals between January 1, 2010 and December 31, 2010. Clalit Health Services-Israel's largest integrated healthcare provider and payer.

Adult Clalit members (aged 18 and older) with at least 1 readmission during the study period were included.

A multivariate marginal Cox model tested the likelihood for discharge during each readmission day in same-hospital readmissions (SHRs), DHRs with HIE, and DHRs without HIE.

**Results:** Of the 27,057 readmissions, 3130 (11.6%) were DHRs and 792 were DHRs with HIE in both the index and readmitting hospital. Partial continuity (DHRs with HIE) was associated with decreased likelihood of discharge on any given day compared with full continuity (SHRs) (hazard ratio [HR] = 0.85, 95% confidence interval [CI]: 0.79-0.91). Similar results were obtained for no continuity (DHRs without HIE) versus full continuity (HR = 0.90, 95% CI: 0.86-0.94). The difference between DHRs with and without HIE was not significant.

**Conclusion:** The prolonged LORS in DHRs versus SHRs was not mitigated by the existence of HIE systems. Future research is needed to further elucidate the effects of actual use of HIE on length of DHRs. *Journal of Hospital Medicine* 2015.