

<b>Institution:</b> University of Surrey		
<b>Unit of Assessment:</b> 3 Allied Health Professions, Dentistry, Nursing and Pharmacy		
<b>Title of case study:</b> Developing and Implementing <i>EZ Analytics</i> : Quality improvements through data analytics of electronic medical records		
<b>Period when the underpinning research was undertaken:</b> 2010-2017		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>	<b>Role(s) (e.g. job title):</b>	<b>Period(s) employed by submitting HEI:</b>
Simon de Lusignan	Professor in Primary Care and Clinical Informatics; Vice-Chancellor's Fellow	01/02/2011 – 31/05/2019 01/06/2019 – present
Terry Desombre	Professor of Health Care Management; Emeritus Professor	01/01/1995 – 22/08/2014 23/08/2014 – present
David Russell-Jones	Honorary Professor of Diabetes & Endocrinology; Vice-Chancellor's Fellow	01/04/2005 – 31/03/2019 1/4/2019 - present
<b>Period when the claimed impact occurred:</b> August 2013- December 2020		
<b>Is this case study continued from a case study submitted in 2014?</b> N		
<b>1. Summary of the impact</b> (indicative maximum 100 words) <p>Surrey research underpinned a Knowledge Transfer Partnership (KTP) with London's largest primary care provider, AT Medics. The KTP developed and implemented an innovative Primary Care Quality Dashboard (PCQD), <i>EZ Analytics</i>. This Business Intelligence (BI) solution analyses aggregated Electronic Patient Record (EPR) data to enable quality improvements. Through the implementation of <i>EZ Analytics</i> impact has been realised as: improved care of diabetes patients, increased uptake of influenza vaccines and optimisation of medicines management for patients under the care of the AT Medics group. Improved efficiency of service delivery leading to increased income and business acquisitions for AT Medics. Commercialisation of <i>EZ Analytics</i> enabling procurement by primary care organisations both nationally and internationally.</p>		
<b>2. Underpinning research</b> (indicative maximum 500 words) <p>Electronic Patient Records (EPRs) are increasingly used as a tool to improve quality, safety and efficiency of healthcare. The EPR prompts to improve patient management, and reduce prescribing errors, as well as facilitating the provision of feedback and financial incentive to reinforce high quality practice. The structured and codified nature of EPRs enable efficient monitoring of primary care at scale and the use of data-driven interventions, but to fully realise the potential of a data-driven approach to healthcare improvements it is imperative that the data captured within the EPR is accurate and complete.</p> <p>Professor Simon de Lusignan leads the Clinical Informatics and Health Outcomes Research Group. They have an extensive track record of high-quality research on the value of improving patient care quality via integrated IT systems utilising EPRs.</p> <p>In 2011, de Lusignan (collaborating with St Georges, London and University of Leicester) led a survey of the EPRs of eight GP practices, with a combined population of 72,000 and a diabetes prevalence of 2.9% (2,340 patients) to determine the extent of miscoding, misclassification and misdiagnosis of diabetes in primary care. The research identified examples of misdiagnosis in all practices, misclassification in seven and miscoding in six, representing 5.8% of people with</p>		

diabetes [3.1]. Furthermore, in a follow-up study, the Surrey research group identified that glycaemic control in diabetes patients was worse when the patients' diagnoses were miscoded in their EPRs [3.2]. As a result of these important findings, the Surrey research group (collaborating with London School of Hygiene & Tropical Medicine; Universities of Nottingham and Leicester) went on to establish a consensus list of consistent coding for clinicians to use in Type 1 and Type 2 diabetes for their diagnosis and subsequent recording in patient EPRs [3.3].

de Lusignan and the Surrey research group (with St George's, London; Kidney Research UK; and NHS partners) explored the effectiveness of an intervention to improve quality of care for patients with Chronic Kidney Disease (CKD) [3.4]. They conducted a clinical trial of Audit-Based Education (ABE) across 93 general practices, with a combined population of over 565,000 patients. This trial compared ABE to guidelines and prompts or usual practice in lowering systolic blood pressure in people with CKD. ABE is a quality improvement intervention which provides education, peer support, and documents the gap between achievement and guidelines. The ability to undertake this type of intervention is enabled by the use of data from EPRs, from which the key patient data for the trial were extracted and aggregated. The outcomes confirmed that individuals receiving the ABE intervention were more likely to achieve a lower blood pressure than those receiving only usual care practice.

In a 2013 study led by de Lusignan (with St George's, London; Royal College of General Practitioners; PHG Foundation) they analysed data from the EPRs of 6 general practices (population ~30,000) to inform an ABE intervention for breast cancer care. Comparing participating practices with guidelines, and each other, before and after implementation of ABE revealed recording risk factors improved, especially for alcohol consumption and smoking, thus confirming that improving coding practice in this context enables improvement in care standards [3.5].

de Lusignan's research demonstrated how access to routinely collected patient data for audit purposes can lead to quality improvements. This was explored in practice in a Knowledge Transfer Partnership (KTP) with AT Medics – London's largest primary care provider. This KTP planned, developed, refined and implemented a Primary Care Quality Dashboard (PCQD) system – essentially a primary care specific Business Intelligence (BI) solution – to measure quality of care, performance, as well as to evaluate innovation and business expansion opportunities. The resulting product – *EZ Analytics* – provides users with semi real-time information from anonymised patient data to support simpler decision making and inform business process across the AT Medics practice group. *EZ Analytics* is commercially available to primary care businesses through the partner company AT-Tech ([ezanalytics.co.uk](http://ezanalytics.co.uk)).

### 3. References to the research (indicative maximum of six references)

**Bold** denotes a University of Surrey affiliation.

**[3.1] de Lusignan S, Sadek N, Mulnier H, Tahir A, Russell-Jones**

**D, Khunti K.** Miscoding, misclassification and misdiagnosis of diabetes in primary care. *Diabet. Med.* 2012; 29: 181–189. doi: [10.1111/j.1464-5491.2011.03419.x](https://doi.org/10.1111/j.1464-5491.2011.03419.x)

**[3.2] Hassan Sadek N, Sadek A-R, Tahir A, Khunti K, Desombre T, de Lusignan**

**S.** Evaluating tools to support a new practical classification of diabetes: excellent control may represent misdiagnosis and omission from disease registers is associated with worse control. *Int J Clin Pract* 2012; 66:874–82. doi: [10.1111/j.1742-1241.2012.02979.x](https://doi.org/10.1111/j.1742-1241.2012.02979.x)

**[3.3] de Lusignan S, Sadek K, McDonald H, Horsfeld P, Hassan Sadek N, Tahir**

**A, Desombre T, Khunti K.** Call for consistent coding in diabetes mellitus using the Royal College of General Practitioners and NHS pragmatic classification of diabetes. *Inform Prim Care* 2012; 20:103–13. doi: [10.14236/jhi.v20i2.31](https://doi.org/10.14236/jhi.v20i2.31)

**[3.4] de Lusignan S, Gallagher H, Jones S, Chan T, van Vlymen J, Tahir A, Thomas N, Jain N, Dmitrieva O, Rafi I, McGovern A, Harris K.** Audit-based education lowers systolic blood

pressure in chronic kidney disease: the Quality Improvement in CKD (QICKD) trial results. *Kidney Int.* 2013; 84(3):609-620. doi: [10.1038/ki.2013.96](https://doi.org/10.1038/ki.2013.96)

**[3.5]** Rafi I, Chowdhury S, **Chan T**, Jubber I, **Tahir M**, **de Lusignan S**. Improving the management of people with a family history of breast cancer in primary care: before and after study of audit-based education *BMC Fam Pract* 2013; 14:105-119. doi: [10.1186/1471-2296-14-105](https://doi.org/10.1186/1471-2296-14-105)

#### **Funding:**

S. de Lusignan (P.I), Knowledge Transfer Partnership. Innovate UK and AT Medics Limited, KTP009063, July 2013 – May 2017, £167,090.92

#### **4. Details of the impact** (indicative maximum 750 words)

As a direct result of the KTP between de Lusignan and AT Medics, *EZ Analytics* - the first Primary Care Quality Dashboard (PCQD) BI Solution - was developed and implemented across practices in the AT Medics group. Impact is claimed for (i) enhanced patient care quality, (ii) growth of AT Medics as a business, and (iii) the commercialisation of the *EZ Analytics* system making it available for use by the primary care sector world-wide. On completion of the project, the KTP Grading Panel awarded the highest grade of 'outstanding' in recognition of the achievement of its objectives **[5.1]**.

#### **1. Enhanced Patient Care Quality**

##### **1.1 Improved care of patients with diabetes**

*EZ Analytics* enabled AT Medics to monitor, analyse and act upon key metrics to support the care of patients with diabetes and implement an effective step change intervention at scale. *EZ Analytics* identified significant variation in the monitoring and management of approximately 13,000 patients with Type 2 Diabetes across AT Medics Practices. Subsequent changes to practice led to an increase in complete annual review from 40% to 92% across the Group over 2 years (2018/2019 national average: 54%; London average: 41%; AT Medics target: 75%). Variations between highest and lowest performing AT Medics Practices reduced from 82% to 23%. Increase in control of all three outcomes for Type 2 Diabetes (BP, Cholesterol, HbA1c) across the Group from 40% to 53% (London average: 41%) representing a 7% improvement for the year ending 2019. Furthermore, as a direct result of these improvements AT Medics achieved the best performing primary care organisation for the management of Type 1 diabetes (all eight NICE recommended care Processes and all three Treatment Targets) for the year 2017/2018 in the National Diabetes Audit only nine months after implementation **[5.2]**. Commenting on the improved targets achieved, Lambeth Clinical Commissioning Group (CCG) in 2018/2019, stated "*EZ Analytics was used as a big force for change [...] enabling practices to view practice level dashboard and drill down into the care processes*" **[5.3]**. Lambeth CCG also conferred upon AT Medics "*The Outstanding Contribution to Primary Care Award*" for these quality improvements to patients with diabetes" **[5.4]**.

##### **1.2 Increased uptake of influenza vaccines**

In summer 2016 as part of the KTP, AT Medics began using an early version PCQD across its organisation to track the impact of new initiatives. One initiative was reception staff administering 'on the spot' influenza vaccinations, which resulted in 20% increased uptake for that winter's campaign compared with the previous winter. The Health Foundation briefing showcased AT Medics' use of this BI solution as an example of good practice in data sharing **[5.5]**.

##### **1.3 Optimisation of medicines management**

Using *EZ Analytics*, AT Medics identified a significant gap between best practice and practical application. A central pharmacy team was created to enable a step-change in medicines optimisation and safety. Over 5,000 patients whose medicines had been managed sub-optimally were identified by *EZ Analytics* and reviewed by the clinical pharmacy team of six. Improvements included: a 25% escalation in the monitoring of patients on disease modifying anti-rheumatic drugs

(DMARD); a 64% increase in the completion of lithium monitoring; a 71% rise in the number of patients on warfarin who are receiving appropriate monitoring. In recognition of this work, AT Medics won the HSJ Award for Optimisation of Medicines Management in 2018 [5.6].

## 2. Business Growth

Deployment of *EZ Analytics* has improved efficiency of service delivery (for example see section 1), in turn leading to a 13% (£4.9m) increase in AT Medics' income when comparing 2017/2018 turnover with that of 2018/19 [5.7]. Moreover, these service delivery improvements enabled by the development and introduction of *EZ Analytics* have supported the acquisition of additional GP sites, in turn improving the quality of care to even more patients. Hence, when the KTP partnership launched in 2014, AT Medics consisted of 15 GP sites (population ~70,000), expanding to 35 primary care sites (population > 250,000) by the conclusion of the KTP in 2017. AT Medics now consists of 37 GP sites, 36 of which are rated as 'Good' and one as 'Outstanding' by the Care Quality Commission [5.8].

## 3. Commercialisation of EZ Analytics

Prior to this KTP, no tool was available for the monitoring and analysis of GP data. Hence *EZ Analytics* has brought a new concept of business intelligence to an organisation (AT Medics), and through its commercialisation to the entire primary care sector. *EZ Analytics* has been commercialised through AT Medics' partner company AT Technology Services Ltd (AT Tech) and is now self-sustaining through income generated. It is available to purchase through the GOV.UK Digital Marketplace [5.9] and has been procured by >16 CCGs, GP Federations and Primary Care Networks worldwide. The platform was handling aggregated data for over 1 million patients, more than 2,000 users, 1,536 clinical measures and key performance indicators, and logins across 84 sites (at the time of data collection, 21/01/2020) [5.10].

## 5. Sources to corroborate the impact (indicative maximum of 10 references)

[5.1] Certificate of Excellence from Innovate UK. Certificate No: KTP009062 (pdf)

[5.2]. [National Diabetes Audit - Report 1 care processes and treatment targets 2017-18, full report](#) Specific reference can be found in the Spreadsheet accompanying the report, using the AT Medics code Y02974: National Diabetes Audit 2017-18 Full Report 1, Interactive Report England [xls, size: 33.8 MB]

[5.3] [Minutes from Lambeth CCG Governing Body Meeting](#) in Public papers dated 15th January 2020. Page 180, Section 6.1, bullet point 2 (pdf).

[5.4] Lambeth CCG awarded AT Medics the [outstanding contribution to primary care award](#). (September 2018)

[5.5] Health Foundation Briefing: Sharing to improve: four case studies of data sharing in general practice (Page 11), May 2018. Available at: <https://www.health.org.uk/publications/sharing-to-improve-four-case-studies-of-data-sharing-in-general-practice>

[5.6] AT Medics award winners at [HSJ Award 2018](#)

[5.7] AT Medics Limited Amended Financial Statements, 31 March 2019, Page 12 (pdf)

[5.8] [Care Quality Commission reports on AT Medics practices](#)

[5.9] Commercialisation of EZ Analytics <https://www.digitalmarketplace.service.gov.uk/g-cloud/services/531901868200462>

[5.10] Testimonial from Dr Alireza Ettefaghian Head of Business Intelligence, AT Medics (pdf)

