Institution: The University of Manchester

Unit of Assessment: 3 (Allied Health Professions, Dentistry, Nursing and Pharmacy)

Title of case study: Transforming referral management in oral surgery

Period when the underpinning research was undertaken: December 2012 - February 2017

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Iain Pretty	Professor of Public Health Dentistry	2011 - present
Tanya Walsh	Professor of Healthcare Evaluation	2018 - present
	Reader in Biostatistics	2016 - 2018
	Senior Lecturer in Biostatistics	2012 - 2016
	Lecturer in Biostatistics	2005 - 2012
Martin Tickle	Professor of Dental Public Health	2004 - present
Caroline Sanders	Professor of Medical Sociology	2016 - present
	Senior Lecturer	2005 - 2016
Paul Coulthard	Honorary Professor	2019 - present
	Professor of Maxillofacial Surgery	2004 - 2018
Joanna Goldthorpe	Research Fellow	2019 - present
	Research Associate	2012 - 2019
Harry Hill	Research Associate in Health Economics	2013 - 2017
Steven Birch	Professor of Health Economics	2006 - present

Period when the claimed impact occurred: 2015 - ongoing

Is this case study continued from a case study submitted in 2014? N

1. Summary of the impact

University of Manchester (UoM) researchers have provided solutions to significant increases in referrals to Oral Surgery (OS) services causing concerns about quality of care and rising NHS costs. Our National Institute for Health Research (NIHR)-funded research project evaluated the quality and cost-effectiveness of a web-based referral management system allied to a commission primary care-based Tier 2 service. The study demonstrated improved access to services and reduced average cost per referral of GBP108. Now over 2,000,000 NHS patients across England and Wales are referred annually through systems based on the research model, with 70% treated in Tier 2 services, providing annual savings of over GBP210,000,000 for the NHS.

2. Underpinning research

The research (NIHR Health Services & Deliverty Research (Award ID: 11/1022/15)) was led by the UoM in partnership with NHS commissioners in the North West from 2012 to 2017. We developed and implemented a complex intervention comprising an online referral management system with remote triage, which was initially piloted in Manchester, supported by a purposely commissioned Tier 2 primary care-based OS service. NHS commissioners implemented the system incrementally across the whole borough of Sefton (population 275,296) to facilitate the evaluation of the system. NHS commissioners made use of the system for all OS referrals in Sefton a mandatory requirement for General Dental Practitioners (GDPs). The system triaged referrals to hospital services, the new Tier 2 service or back to the referring GDP depending on clinical assessment performed remotely. Integrated quantitative and qualitative methodologies were employed in the project. The following workstreams were undertaken:

- Diagnostic test accuracy methodology was used to determine the efficiency of remote clinical triage by both consultants and GDPs compared with face-to-face clinical triage by a senior consultant as the reference standard (referrals were categorised as suitable for hospital services, Tier 2 service, or by a GDP).
- Interrupted time series methodology was used to assess the implementation of a new online referral management system using (i) a passive online referral management and triage system without active referral (ii) remote consultant-led triage and active referral including to a newly-commissioned Tier 2 service and (iii) triage undertaken by GDPs.
- Parallel qualitative elements were employed to consider issues of implementation and acceptability of the specialist primary care service for consultant, primary care providers and for patients referred through the system.
- Economic evaluations were undertaken to determine the impact on NHS and societal costs.

Our research showed that the implementation of an electronic referral management, when combined with clinical triage and commissioning of Tier 2 services, can improve the quality and efficiency of oral surgery referrals with significant savings for the NHS. The key findings of our research were:

- The electronic referral management system, when combined with consultant triage, resulted in 45% of cases been diverted to the Tier 2 service rather than more expensive hospital-based services, and 43% of cases diverted when GDP triage was implemented [1, 2].
- No detrimental impact on health outcomes for patients was observed during the course of the research with either consultant or GDP triage [1, 2] and post-operative complication rates were the same for both Tier 2 and hospital services.
- GDPs accepted and were successful in their transition to the novel referral system [1, 3].
- Patients appreciated more rapid access to services closer to home [1, 3].

The system is flexible and can be applied to other fields, as illustrated by further research evaluating its use within eye care services [4].

3. References to the research

1. **Goldthorpe J, Walsh T, Tickle M, Birch S, Hill H, Sanders C. Coultard P, Pretty IA.** An evaluation of a referral management and triage system for oral surgery referrals from primary care dentists: a mixed-methods study. *Health Serv Deliv Res*. 2018;6(8). doi:10.3310/hsdr06080

2. **Goldthorpe J**, **Sanders C**, Gough L, Rogers J, Bridgman C, **Tickle M, Pretty I.** Implementing and evaluating a primary care service for oral surgery: a case study. *BMC Health Serv Res*. 2018; Aug 14;18(1):636. doi: 10.1186/s12913-018-3420-3

3. **Goldthorpe J**, **Sanders C**, Macey R, Gough L, Rogers J, **Tickle M**, **Pretty I.** Exploring implementation of an electronic referral management system and enhanced primary care service for oral surgery: perspectives of patients, providers and practitioners. *BMC Health Serv Res.* 2018; Aug 20;18(1):646. doi: 10.1186/s12913-018-3424-z

4. Harper, R.A., Dhawahir-Scala, F., Wilson, H., Gunn, P., Jinkinson, M.,**Pretty IA**., Fletcher, S., Newman, W. Development and implementation of a Greater Manchester COVID19 Urgent Eyecare Service. *Eye* 2020. doi: 10.1038/s41433-020-1042-6

4. Details of the impact

Context

When this project was conceived there were significant concerns about NHS oral surgery referrals [A]. The 2006 England and Wales NHS dental contract significantly increased referrals, as practices were paid the same fee to refer a patient or undertake the procedure themselves. Costs spiralled, as hospital care was expensive with few alternative options for NHS commissioners. Quality was also a concern due to inappropriate referrals, tortuous referral pathways, long waits and lack of care close to home. A web-based referral system was developed collaboratively between UoM and local NHS staff in Manchester but there was uncertainty about remote triage, the quality of Tier 2 services and the cost-effectiveness of a managed referral system. At that time NHS dental commissioners had no experience in such systems and little activity in this area until this research was conducted.

Pathways to impact

Impact was managed though collaboration with NHS decision-makers in an agreed implementation strategy. The sequential implementation of the system as a 'live' NHS service meant that impact would be both measurable and cumulative during the project. When the research was completed and prior to publication, the system in Sefton was retained and rapidly expanded across the North West through local commissioning networks [B]. Sefton provided a live, rigorously evaluated working implementation model, which attracted interest from NHS dental commissioners leading the rapid adoption across England [B], [C], [D].

Reach and significance of the impact

Although only completed in 2017 the research has had a rapid and transformative impact on management of care pathways in NHS dentistry. After the North West, the system was rolled out across the Midlands, Thames Valley, Kent, Surrey and Sussex, East Midlands [C], and most recently across the whole of Wales [D]. The recommendations from our work have been embedded within the service specifications used in tenders for new referral management and Tier 2 contracts. Here we use data made available by FDS Consultants, a consortium of dental and medical NHS consultants based in the North West of England and one of two companies providing referral management services based on the research model. Table 1 summarises the rapid growth in use, and the geographical spread of the oral surgery system across England. The average cost of an acute trust minor oral surgery

referral in the North West region is approximately GBP650; our research showed a GBP108 saving for a referral to a Tier 2 service and this price difference has been used to estimate cost savings. These savings are primarily used to expand Tier 2 capacity for specialist dental care. An appraisal of the implementation of a managed oral surgery referral service in a Strategic Transformation Plan in the Midlands demonstrated cost savings of GBP 4,192,444 in one year [C].

Table 1: Oral surgery referral management services in England only	**FY 2017/18**	**FY 2018/19**	**FY 2019/20**
Total number of CCGs with commissioned referral management service	128	159	175
Total number of referrals	131,919	209,714	239,644
N (%) of referrals deflected to Tier 2 services	80,782 (67.4)	131,139 (62.5)	158,117 (66.0)
Estimated cost savings (millions)	GBP8.74	GBP14.19	GBP17.11

The figures presented are an underestimate of the full impact of the research as they are solely for oral surgery, only apply to England and only apply to one referral provider. The other main provider has a similar coverage to FDS and hence, if extrapolated, a doubling of the numbers would be appropriate. Concerns about providing cost savings at the expense of a reduction in quality were dispelled by our research and reinforced by findings from on-going evaluations. In 2018/19 94% of patients treated reported their problem was resolved and 99.7% assessed the service providing their care as good or better [B], [D]. This is supported by the experience in Wales where the new referral service, embedding our research findings, has been reported as having "*a significant impact in improving the quality, content and validity of referrals to dental specialties*" [D]. It is also reported to have, importantly, improved access to specialist services and patient experience for the population of Wales.

Adaptation and expansion: Referral management systems have now expanded to orthodontics (another high referral speciality), starting in NHS Cheshire and Mersey which from 2017-2020 has seen a growth of 3,500 referrals to Tier 2 services whilst keeping secondary care referrals at the same level [B]. Oral Medicine is now included with the inclusion of clinical photographs in the online system [E]. Most recently the referral systems across England were able to rapidly adapt to the COVID19 crisis by triage and directing patients in pain to Urgent Dental Care centres. Over 34,000 patient episodes of care were delivered via this route between March and August 2020 [B]. The referral system was adapted to support thousands of urgent optometry referrals via COVID19 Urgent Eyecare Services [4]. This demonstrates the far-reaching impact of the work beyond dentistry and the possibility of using the system to support other referral pathways in the future.

Overall for all dental specialties across England and Wales, approximately 10,000 referrals per day are now processed from general dental practices with 70% of referrals diverted to primary care-based Tier 2 services, producing estimated savings for the NHS of over GBP210,000,000 per year.

5. Sources to corroborate the impact

A. Dental Programme Board. Review of Oral Surgery Services and Training. Medical Education England, 2010. www.baos.org.uk/resources/MEEOSreview.pdf
Report highlighting the challenge of steadily increasing oral surgery referrals, and associated NHS costs, from primary to secondary care.

B. Letter from the Lead Consultant in Dental Public Health North West and co-investigator (dated 24.09.20).
Confirms the incremental implementation in Sefton during the project, retention of the system in Sefton after the project and rapid take up across the North West. Also confirms application and roll out of the system to other services such as orthodontics. Confirms the transformational benefits for patients and cost savings for the NHS.

C. Letter from the Dental Commissioning Lead NHS Central Midlands East (dated 01.03.2021).
Confirms the successful implementation of the system based on the research model for NHS oral surgery services across the Midlands and benefits for patients and the NHS.

D. Letter from the Chief Dental Officer for Wales and co-investigator (dated 25.09.2020).
Confirms the adoption of the system across the whole of Wales and its benefits.

E. Letter from a consultant in Oral Medicine and Dean of Leeds Dental School (dated 06.11.20).
Confirms the successful adaptation of the system for use in NHS Oral Medicine Services.