Successful Refinement of a Cochlear Implantation Service

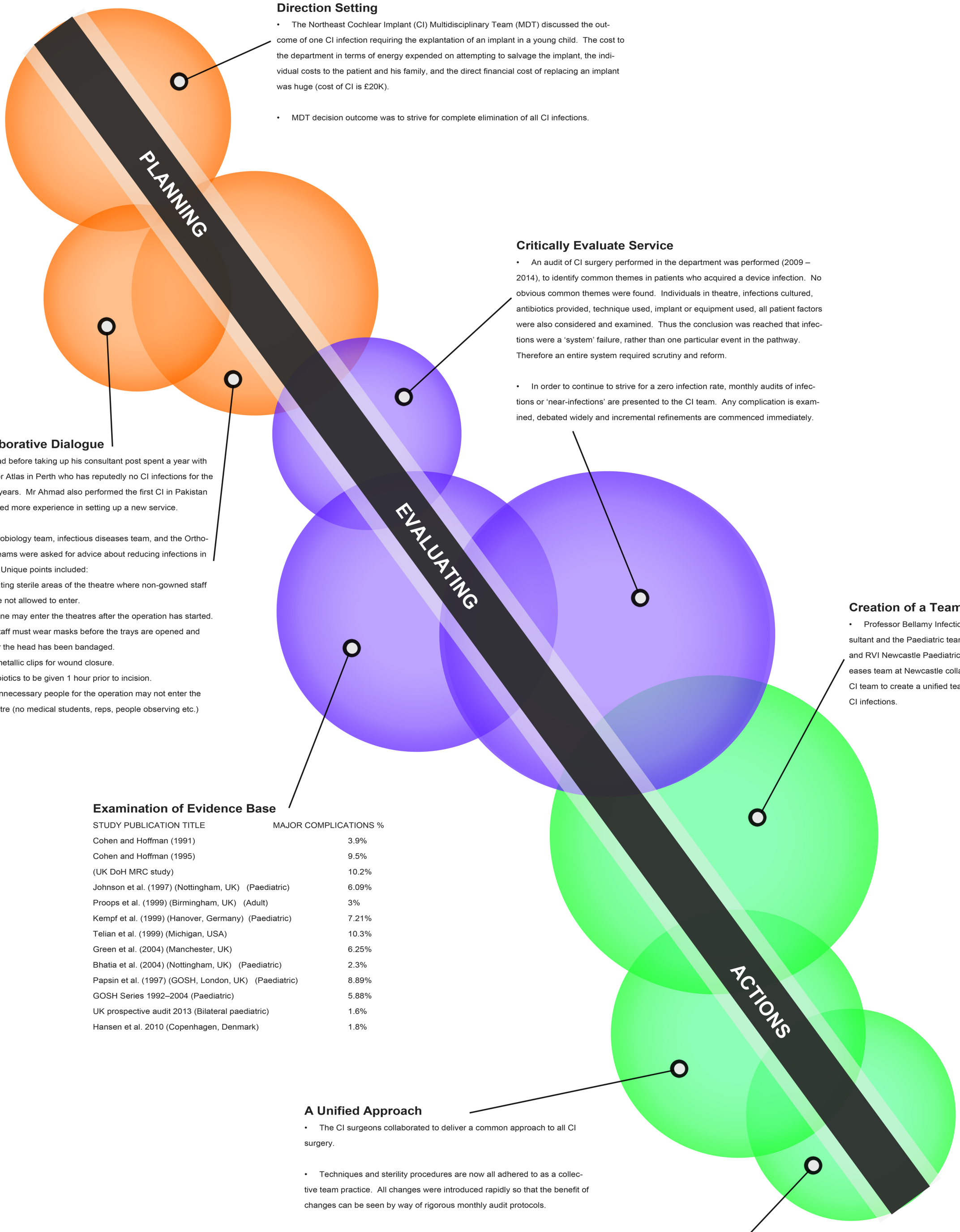
Authors: V.Veer, N.Ahmad, M.Hawthorne, A.Banerjee

South Tees Hospitals NHS
NHS Foundation Trust

Introduction

Cochlear implant (CI) surgery restores hearing to profoundly deaf patients. Each device requires a lengthy operation and costs approximately £40,000 per ear. Therefore reducing the risk of needing a replacement is paramount for the patient and NHS finances.

The aim of this project is to improve the North East CI Service by eliminating the number of major infections that required removal of a CI. The global rate of this occurring is 5.9%.



Direction Setting

- The Northeast Cochlear Implant (CI) Multidisciplinary Team (MDT) discussed the outcome of one CI infection requiring the explantation of an implant in a young child. The cost to the department in terms of energy expended on attempting to salvage the implant, the individual costs to the patient and his family, and the direct financial cost of replacing an implant was huge (cost of CI is £20K).

- MDT decision outcome was to strive for complete elimination of all CI infections.

Critically Evaluate Service

- An audit of CI surgery performed in the department was performed (2009 – 2014), to identify common themes in patients who acquired a device infection. No obvious common themes were found. Individuals in theatre, infections cultured, antibiotics provided, technique used, implant or equipment used, all patient factors were also considered and examined. Thus the conclusion was reached that infections were a 'system' failure, rather than one particular event in the pathway. Therefore an entire system required scrutiny and reform.

- In order to continue to strive for a zero infection rate, monthly audits of infections or 'near-infections' are presented to the CI team. Any complication is examined, debated widely and incremental refinements are commenced immediately.

Collaborative Dialogue

Mr Ahmad before taking up his consultant post spent a year with Professor Atlas in Perth who has reputedly no CI infections for the last five years. Mr Ahmad also performed the first CI in Pakistan and gained more experience in setting up a new service.

The microbiology team, infectious diseases team, and the Orthopaedic teams were asked for advice about reducing infections in theatre. Unique points included:

- Creating sterile areas of the theatre where non-gowned staff were not allowed to enter.
- No one may enter the theatres after the operation has started.
- All staff must wear masks before the trays are opened and after the head has been bandaged.
- No metallic clips for wound closure.
- Antibiotics to be given 1 hour prior to incision.
- All unnecessary people for the operation may not enter the theatre (no medical students, reps, people observing etc.)

Creation of a Team

- Professor Bellamy Infectious diseases consultant and the Paediatric team at Middlesbrough and RVI Newcastle Paediatric Infectious diseases team at Newcastle collaborated with the CI team to create a unified team for dealing with CI infections.

Examination of Evidence Base

STUDY PUBLICATION TITLE	MAJOR COMPLICATIONS %
Cohen and Hoffman (1991)	3.9%
Cohen and Hoffman (1995)	9.5%
(UK DoH MRC study)	10.2%
Johnson et al. (1997) (Nottingham, UK) (Paediatric)	6.09%
Proops et al. (1999) (Birmingham, UK) (Adult)	3%
Kempf et al. (1999) (Hanover, Germany) (Paediatric)	7.21%
Telian et al. (1999) (Michigan, USA)	10.3%
Green et al. (2004) (Manchester, UK)	6.25%
Bhatia et al. (2004) (Nottingham, UK) (Paediatric)	2.3%
Papsin et al. (1997) (GOSH, London, UK) (Paediatric)	8.89%
GOSH Series 1992–2004 (Paediatric)	5.88%
UK prospective audit 2013 (Bilateral paediatric)	1.6%
Hansen et al. 2010 (Copenhagen, Denmark)	1.8%

A Unified Approach

- The CI surgeons collaborated to deliver a common approach to all CI surgery.

- Techniques and sterility procedures are now all adhered to as a collective team practice. All changes were introduced rapidly so that the benefit of changes can be seen by way of rigorous monthly audit protocols.

A Successful Future

- Since the implementation of these refinements, there have been no CI infections in the North East CI team.

- A national survey of CI surgery is being developed by the North East CI Team to allow cohesion between British CI centres, allowing information about successful practices to be effectively disseminated. We hope this will establish a set of 'Best Practice Guidelines' for CI surgery.

'An ounce of prevention is worth a pound of cure'
Benjamin Franklin.