2.3 Other efforts to close the gap: the WFSA’s Global Oximetry project

During the 13th World Congress of Anaesthesiologists in Paris in 2004, the Safety and Quality of Practice Committee of the World Federation of Societies of Anaesthesiologists (WFSA) identified the provision of pulse oximetry during every anaesthetic in the world as a priority to improve patient safety. The WFSA, in conjunction with the Association of Anaesthetists of Great Britain and Ireland, and General Electric Healthcare (GE) created the Global Oximetry (GO) Project. Collaborating institutions included University of Manchester (UK), University of Auckland (NZ), the New Zealand Society of Anaesthetists, the New Zealand Vietnam Trust and the International Clinical Epidemiology Network (INCLEN).

The aims of the Global Oximetry project were:

1. To set new worldwide standards for using oximetry in anaesthesia
2. To understand the barriers to sustained oximetry utilisation in such environments
3. To create appropriate oximetry solutions for low income and difficult anaesthesia environments

The first aim has been achieved. In Cape Town in March 2008, the revised International Standards for a Safe Practice of Anaesthesia mentioned above were endorsed by the General Assembly of the WFSA. In these standards the use of pulse oximetry is “highly recommended,” implying that it falls within the minimum standards for safe anaesthesia and is expected in all elective procedures. Similar wording is used in the recent WHO Guidelines for Safe Surgery, and a specific check to confirm that a pulse oximeter is on the patient and working has been included in the WHO Surgical Safety Checklist.

The second aim has yet to be achieved. WHO, through its World Alliance for Patient Safety, recognizes that this is an essential component of safe surgical and anaesthetic care and has committed substantial energy and time to move this issue forward. Oximetry, as previously discussed, is lacking in a substantial portion of the developing world. The availability of a low cost, highly robust, user friendly oximeter has yet to be introduced to a global market. While GE has remained supportive of the GO project, they have not yet committed to the development of a low cost oximeter.

Understanding the barriers to sustained oximetry use has been advanced through pilot projects which have introduced pulse oximetry in Uganda, Vietnam, India, and the Philippines. The oximetry gap was defined in specific areas where the project was to be undertaken, the use of donated oximeters was demonstrated through log books, and focus groups were used to understand the features of an ideal oximeter. In Uganda, ownership of the oximeters was placed in the hands of individual anaesthesia providers, while in the Binh Dinh province of Vietnam it was placed in institutions within the province. There was a more sophisticated anaesthesia environment in India, which provided its own challenges when introducing oximetry monitoring. In the Philippines, the project was undertaken in Cebu and involved the post-anesthesia care unit (PACU).
GE Healthcare donated oximeters and provided training materials and logistical support in all four country projects. Pulse oximetry units with a plethysmographic display of the pulse (as a dynamic bar graph) and a pitch that varied with saturation level were considered suitable for continuous monitoring of anaesthetised patients and were deployed in the first three projects. A more basic, smaller, and inexpensive unit was deployed in Cebu and was considered suitable for use in the PACU.

There were a number of important findings that are relevant to any project hoping to improve the distribution and use of pulse oximetry worldwide. Several are discussed in other sections of this document: 1) there was a substantial gap in oximetry availability in both the operating room and in the recovery unit; 2) there was a clear but variable need for education of providers to interpret and respond to desaturation, both in the operating room and elsewhere in hospitals, notably the recovery units; and 3) there were a set of important features that will be integral to the development an ideal low cost pulse oximeter. A number of other lessons are also important to consider:

- Projects were most successful when permission from appropriate authorities was obtained in advance. Requesting assistance from local champions, including clinical personnel, administrators, and professional societies, was also powerful.
- Logbook data indicated that oximeters were used regularly when available. These data also showed that desaturation episodes were identified on a regular basis, and responses to these episodes were often appropriate.
- Many providers felt the need for oximetry in the PACU was equally important to that in the operating room. In addition, meeting the need for oximetry in the operating room led to greater use of oximetry in PACU as providers and administrators became convinced of its value.
- The oximeters used in the project were highly rated, as they were easy to use and robust. There were specific issues regarding some of their features, in particular the reliability of their power source and the sensitivity of their probes. While the probes were more vulnerable than the oximeters, they proved to be more durable than expected. At the end of one year, the majority of the original probes were still functioning and in use. However, different probes were needed for adults, children, and neonates.
- Pulse oximeter maintenance is of prime importance. For regular maintenance to be successful, it was essential to have a local supplier of parts and service who was easy to contact and responsive to the needs of the users. A budget allocated for the ongoing provision of maintenance and a clear protocol for identifying and repairing non-functioning units were also critical. In a number of places, oximeters were used in remote locations until problems developed (sometimes as simple as a flat battery), after which the oximeter was set aside until the next visit from a GO team member.
- The initial cost of an oximeter was less important in achieving universal use than convincing clinical and administrative personnel of its value in patient safety. However, the ongoing costs and logistics of maintenance, including the replacement of probes (which might prove more expensive over the life of
an oximeter than the initial cost of the oximeter itself), were not insignificant as noted in the previous point.

- Once introduced to the project, providers were willing to commit to the ongoing and appropriate use of oximetry. Interview and focus group data confirmed that participating providers were uniformly positive about pulse oximetry and strongly convinced of its value in contributing to patient safety.
- The key to promoting sustained change lies in working with local providers, hospitals administrators, and central government administrators to ensure that pulse oximetry is adopted as a standard of care and that its use is informed and appropriate. Local financial commitment must also be made to maintain the oximeters and replace probes and oximeters as needed. Clear systems for achieving this must be developed and maintained.

In summary, the gap in pulse oximetry is substantial in many parts of the world. A sustainable change in anaesthesia practice is achievable. Providing a suitable and affordable oximeter is one element in this. Maintenance is critical. Education is important. Engaging local providers and funders is also important, and in some areas it is likely to be essential.