Running a safe eye service for patients and personnel

The safety of staff members and the patients they care for is fundamental to high quality eye care delivery.

Safety is of paramount importance when delivering health care. Not only is it vital to keep patients safe during their journey to seek and receive medical care, it is equally important to protect health care's most valuable resource, its personnel, or staff members.

Creating and maintaining a culture of safety within clinical settings should be a priority for health care leaders and managers; however, it is the responsibility of each and every member of a hospital or clinic's workforce to adopt and champion safe practices.

In this issue, we explore what safe practice means specifically for eye care service providers by applying the fundamentals of safe practice both inside our institutions (by improving risk management, infection control, waste management, and safe prescribing of medication) and outside them – by keeping staff and patients safe during service delivery to local communities.

Creating a sustained safety programme can be challenging. Our authors offer practical tips and advice towards achieving this goal, mindful of the resource limitations many of us face.

Safety is intrinsically linked with the provision of high quality eye care; it should be an integral part of everything we do.

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The role of management in providing safe eye care delivery

In order to deliver high quality, safe eye care to patients and ensure a positive, care-giving attitude among staff members, it is vital that leaders and managers recognise and prioritise patient and staff safety.

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The role of management in ensuring the safety of patients is critical, but it is often overlooked in safety programmes for eye care providers. Health care leadership and management are responsible for creating an environment that protects patients and staff members from avoidable harm and reduces errors in clinical settings. Creating this environment involves:

- Being clear about the safety goals in every area of work
- Creating well-defined processes or standard operating procedures (SOPs) to achieve these goals
• Identifying the staff member(s) responsible for each process
• Training staff members in the processes and SOPs
• Providing clarity on what incidents to report
• Setting up systems for continually refining processes and reviewing SOPs
• Identifying individuals who will lead and can be held accountable for maintaining safety in a given work area.

How safe is eye care?

It may be tempting to think of eye care as relatively safe, compared to other medical specialities. However, a recent study of medical errors (adverse events) in US Veterans Health Administration (VHA) medical centres from 2010–2017 showed that the highest number of reported errors or adverse events occurred in ophthalmology (72) followed by dentistry (30) and anaesthesiology (28). Reducing eye care related adverse events is a challenge. In many settings, patient volumes and time pressures are high. The most common eye procedure – cataract surgery – involves many steps, with many opportunities for error: starting with documenting several measurements using multiple equipment (during biometry), then sourcing a non-expired intraocular lens of the correct power, followed by carrying out safe surgery on the correct patient, in the correct eye.2,3

An organisation that addresses safety (and any errors that may occur) in an open and transparent way demonstrates to staff members and the public that it values their wellbeing. This encourages staff members to prioritise a culture of safety, knowing they have the support of their managers. It also makes the organisation more efficient and the care process more effective. With this in mind, Aravind Eye Hospitals has developed a systematic approach to providing safer eye care delivery by adopting the following principles.

Defining safety goals. Safety goals must be defined at an organisational level and adapted to suit individual departments or settings. The formal efforts to integrate patient safety in Aravind eye hospitals was initiated in 2007–08. Initially, Aravind adopted the 2009 Joint commission (USA) hospital patient safety goals,6 which staff members struggled to relate to their eye care work. Realising this, and based on the incidents that were reported, the authors adapted the Joint Commission (USA) objectives and developed the safety goals in Figure 1, specific to eye care, in 2013–2014. It was felt to be equally important to have specific goals at department level (Figure 2, overleaf).

Figure 1 Eye care safety goals: organisation level

<table>
<thead>
<tr>
<th>Patient safety goals – Aravind Eye Care system (2021)</th>
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Figure 2 Department-specific safety goals focusing on patient safety. E.g., Counselling for cataract surgery

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<tr>
<th>Goal 1</th>
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<td>Ensure that the eye is correct</td>
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<td>Goal 3</td>
<td>Ensure that the biometry measurements are correct</td>
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<td>Goal 4</td>
<td>Ensure that the IOL design is correct</td>
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<td>Goal 5</td>
<td>Ensure that the IOL power is correct</td>
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<td>Goal 6</td>
<td>Ensure that the IOL needed is available</td>
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<td>Goal 7</td>
<td>Ensure that pre-operative investigations are complete</td>
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<td>Goal 8</td>
<td>Ensure that a physician has checked that patients with systemic conditions are healthy enough to undergo surgery</td>
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<tr>
<td>Goal 9</td>
<td>Obtain consent from the patient or those attending with the patient</td>
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<tr>
<td>Goal 10</td>
<td>Ensure that the correct documentation is available and completed and avoid transcription errors</td>
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Creating systems that enhance patient safety is crucial as errors often happen due to failures in the system. The causes go beyond the individuals who may have made mistakes. Good safety systems ensure standardisation of procedures, specific steps to ensure safety protocols, appropriate delegation of work to the right personnel, and checklists at critical points in the patient's journey. Developing and refining systems, with full participation of staff members, will streamline the work and reduce risk.

Standardising and continuously improving work processes progressively reduces risk. Senior clinical staff and managers are responsible for creating standard operating procedures (SOPs) and risk assessments for routine clinical activities and administrative tasks (e.g., booking follow-up appointments). Managers must also ensure that every member of staff is trained in these SOPs and competent to deliver them. SOPs and risk assessments should be made easily accessible to staff members in the form of posters or quick reference guides which are regularly reviewed and updated.

Choosing suitable equipment and ensuring all staff members are trained appropriately. Routine eye care involves the use of both basic and highly technical instruments and equipment. All staff members who use instruments and equipment should be appropriately trained beforehand, certified and have access to supporting documentation (SOPs, user manuals, and risk assessments).

Building an organisational structure and process for safety is crucial. It is important to develop this structure, at both leadership and operational level.

For example, staff members can be assigned the role of ‘safety champions’. The main role of a ‘safety champion’ is to model safe practices and behaviour. A champion is selected from each group or type of eye care worker; they then form a team that meets regularly to contribute to the development and implementation of safe practice in all areas. Another approach is to invite staff members and managers to share ideas and experiences to improve processes in eye care and to mitigate risks through sharing lessons learned. This must be done in a supportive and positive way, particularly when discussing errors or difficulties that may have occurred. This encourages staff to learn from previous mistakes and understand how to avoid them in future. Such discussions provide an opportunity to understand the magnitude of errors, their frequency, and what contributes to them.

Creating a culture of reporting errors and near misses is a core element of good clinical practice. Early reporting of errors improves staff and patient safety and makes it possible to investigate and address the root causes of the error. Ideally, a reporting system should make it possible for staff members to report incidents anonymously – or near misses without identifying themselves, the patient, or the staff members involved. This allows others to learn from the situation without fear and enhances the commitment of staff members towards safer care. There is no universally accepted way to report errors, but it is possible to create a simple form to record essential details such as time and place, people involved, description of the error, and the possible circumstances that led to the error.

Incident reporting system

Aravind originally used a paper-based reporting system, with low reporting rates. A computer-based, online reporting system was set up 8 years ago, and since then more than 16,500 events have been reported. The authors believe this system to be more successful because it is now easier for anyone to report a safety-related incident or near miss anonymously.

The value of any reporting system lies in how useful it is in helping to avoid future incidents. Each incident reported using this system is therefore brought to the attention of the chief medical officer and quality manager instantly, via an automatic e-mail. These senior staff members, who are empowered to address the root causes of safety incidents, can also use the system to carry out detailed analyses and generate actionable reports.

Supporting staff wellbeing. As a service sector, it is vital that leaders and managers recognise the importance of ensuring the wellbeing of staff members. Fatigue levels, inadequate training and a stressful work environment can contribute to human errors and affect compliance with SOPs and risk assessments. A deeper understanding of these factors, and addressing them, will lead to safer practices.
One of the factors that contribute to employee stress is unfair treatment or harassment. Managers can establish a culture of respect and dignity in the workplace by:

- Taking the time to get to know staff members and the challenges they face
- Treating everyone with respect (i.e., modelling appropriate behaviour)
- Having an ‘open door’ policy that allows any staff member to make a suggestion, ask a question, or raise a concern.

Other issues affecting staff members’ stress levels and health at work can include inadequate rest breaks, a lack of access to healthy food and beverages, and scheduling difficulties (e.g., if a person is given too many night shifts in a short space of time).

Finally, ongoing education programmes for staff members and managers that focus on safety are essential to continually build awareness and promote safe practices.

1 Constant monitoring and review is vital to ensure the efficacy of safe processes. It is important to do root cause analysis of all incidents and near misses and discuss them as a group, both for further refinement and for reinforcing the value of following set safety protocols.

2 Constant reinforcement by the organisational leadership of their commitment to protect staff and patients is important. Safety is not a destination, but a continuous process.

Conclusion

Developing a sustained safety programme is challenging; it must start with the commitment of managers and leaders. Leaders who are passionate about safety should establish the process for achieving the safety outcomes in both clinical and non-clinical areas, build local leadership to take ownership at operational level, foster a safety culture, prioritise safety through proper communication with their teams, and provide appropriate resources to build practices that enhance safety.

References


Acute conjunctivitis is frequently caused by adenovirus, which is highly transmissible and can be acquired from contaminated equipment, including trial lenses and frames, or health care workers’ hands. Large outbreaks have been reported, and the impact can be very significant on eye services as health care workers may also be affected, resulting in sore eyes, blurred vision, and the need to take time off work.

Health care-associated endophthalmitis is usually due to bacterial infection, resulting from contaminated equipment or instruments, contaminated liquids such as eye drops or intravitreal injections, or poor surgical or clinical technique that introduces bacteria from the patient’s own skin or from the hands of the health care worker, usually after cataract surgery or intravitreal injection. Although the frequency of endophthalmitis is low, it is potentially devastating for the patient. Respiratory tract infections due to viruses such as influenza, rhinovirus, and coronavirus may be transmitted more commonly in eye health than in, say, general practice. This is because eye care equipment and instruments (such as slit lamps) come into close contact with the patient’s face and can easily become contaminated with respiratory tract viruses that, in turn, may be transmitted to the next patient. Health care workers also work in very close proximity to patients when carrying out eye examinations or procedures and are therefore at risk of acquiring and transmitting these infections. This has become a more serious problem during the COVID-19 pandemic, and specific measures to reduce the risk of COVID-19 transmission in eye care were discussed in a previous issue of this journal.

Reducing the risk to patients
Standard precautions relevant to reducing the risk of health care-associated infections in eye health are:

- **Hand hygiene**
- **Environmental cleaning**
- **Safe reprocessing of reusable equipment and instruments**
- **Respiratory hygiene and cough etiquette**
- **Aseptic non-touch technique**.

**Hand hygiene** can be achieved by washing with soap and water or, where water is not readily available, by using alcohol-based gels/sanitisers. Be aware that alcohol-based gels/sanitisers may be irritant to the eyes so, for contact procedures, soap and water is preferred.

Clinics and treatment rooms, including all surfaces, windows, doors, and fittings, should be **cleaned** regularly. Depending on the type of surface, alcohol wipes, alcohol solutions, or sodium hypochlorite solutions are generally recommended. Take extra care when cleaning surfaces which may be in contact with patients, such as chin and head rests or hand-held Snellen charts.

**Reprocessing** refers to the cleaning, disinfection, and/or sterilisation of reusable devices. The specific processes depend on the instruments and the manufacturer’s instructions should be followed, as well as any local policies. If it is practical and affordable, use single-use instruments and equipment instead and dispose of them safely.

**Respiratory hygiene and cough etiquette** refers to the guidance given to patients and staff members about how to reduce the risk of viral transmission via coughs and sneezes (see Figure 1).

An **aseptic non-touch technique** should be used for procedures where applicable. For operative procedures, good aseptic surgical technique, including the use of sterile drapes, gowns, and gloves, is particularly important for preventing infections introduced as a result of contamination by the patient’s own skin flora.

Reducing the risk to health care workers
Health care workers examining and treating eye diseases may be exposed to infectious agents via respiratory droplets, tears, or blood. Practising good infection prevention and control, such as hand hygiene, use of personal protective equipment (PPE), safe use and disposal of sharps, and correct waste management will also reduce the risk of exposure.

**Hand hygiene** protects staff members from eye and respiratory tract infections acquired from patients. This risk is also reduced by using **personal protective equipment** (PPE), such as gloves, masks, protective eye wear, and face shields. Use of respiratory protection (masks and face shields) has become especially important during the COVID-19 pandemic.

**Sharps** pose a direct risk to the health care worker, but they also pose a risk to other staff members, such as cleaners. They must be properly disposed of in a sharps container, such as a box or tin.

All health workers must be aware of the local protocol for needle stick injuries, including assessment for post-exposure prophylaxis and following up with occupational health. Other contaminated waste should also be disposed of safely, for everyone’s protection.

Figure 1 An infographic on respiratory hygiene and cough etiquette prepared by the Government of Slovenia

1. Cover your mouth and nose with a paper tissue when you cough or sneeze.
2. Dispose of the tissue in a waste bin after every use.
3. If you don’t have a paper tissue, cough/sneeze into your upper sleeve.
4. Wash your hands with soap and water after coughing/sneezing.

**Respiratory hygiene and cough etiquette** refers to the guidance given to patients and staff members about how to reduce the risk of viral transmission via coughs and sneezes (see Figure 1).
To improve the safety of patients and staff members, all health care facilities should have an infection prevention and control programme which takes account of the specific risks and infections that may occur.

Infection prevention and control programmes have multiple components (Figure 2), including:

- Systems to manage and monitor the prevention and control of infection
- A clean and safe environment
- Appropriate use of antimicrobials, including antibiotics
- Providing accurate information to patients and staff members
- Prompt identification of people who are at risk of developing an infection
- Competent staff (education and training)
- Adequate isolation
- Microbiology and laboratory support
- Adherence to guidelines and procedures
- Occupational health (including vaccination of staff members).

**Roles and responsibilities**

Although prevention of harm to patients through good infection prevention and control is everyone’s responsibility, infection control programmes should ideally be overseen by an infection control team comprising a senior nurse, an infection control doctor (usually a clinical microbiologist, infectious disease specialist, or hospital epidemiologist), and nurses or infection control practitioners with appropriate qualifications and experience. The infection control team is responsible for developing locally relevant infection control policies, including guidelines and standard operating procedures (SOPs). The team should also supervise training, surveillance and monitoring, and audit, and should report regularly to the hospital/institution management team or administration. The team should make themselves available on site, so that staff members can easily ask for advice about infection control matters. The infection control team should be supported by a multidisciplinary infection control committee, which makes decisions at institutional level, reviews any incidents or potential outbreaks, and supports the team to carry out wider organisational change where this is needed. The composition of the infection control committee will depend on the size of the institution, but should include managers, administrators, clinical and nursing leads, representatives from the different specialties (so that the programme takes into account specialty-specific needs) and representatives from estates, sterilisation services, and cleaning services. The committee should meet at regular intervals, usually 3 or 4 times a year, to review and discuss reports from the team and raise any concerns from their own departments. The committee should ensure that the infection control team have the necessary resources to run the programme by identifying priorities and needs and reviewing budgets accordingly. For example, the infection control team may identify an increased number of infections in patients undergoing surgical procedures and find that it is due to inadequate sterilisation of equipment. The team will present their report to the infection control committee, who discuss the findings and decide what action to take (e.g. repairing or replacing the equipment).

The team should have access to a clinical microbiologist for additional advice. Larger hospitals may have their own clinical microbiologist on site, in which case they will usually be part of the infection control team. Otherwise, a single microbiologist may cover several sites and provide on-call cover for treatment questions or outbreak control.

An effective infection prevention and control programme also involves ongoing monitoring and audit to ensure that the required standards are met. The infection control team should oversee the monitoring and audit programme and should present the results to the infection control committee so that actions can be taken where necessary.

**Conclusion**

Good infection prevention and control is vital for reducing health care-associated infections and improving patient outcomes. This is particularly important with the emergence of antimicrobial resistance, as health care-associated infections are more likely to be multi-drug resistant and therefore difficult to treat. The constant evolution of microorganisms means that perfect infection control and prevention is unlikely; however, it is an ideal we must strive for.

Hopefulv, one of the lessons that will come out of the COVID-19 pandemic will be to pay more heed to routine infection prevention and control hygiene measures.

The multidisciplinary nature of the infection control committee is an important reminder that everyone has a responsibility to reduce health care-associated infections and prevent harm to patients. The role of the infection prevention and control team is to help all staff members to achieve this.

**References**

The role of an infection prevention and control nurse

A nurse may be assigned overall responsibility for infection prevention and control in an eye hospital or clinic – a demanding role that is vital for ensuring the safety of patients.

Never has the role of infection prevention and control been more critical than during the current global COVID-19 pandemic.

Infection prevention and control involves many domains in the clinic or hospital setting, from patient management and staff health to environmental controls and building maintenance. The person assigned to lead infection prevention and control in an eye unit or hospital must therefore have a wide range of experience and may need to undertake additional training so they can give advice in a timely manner. There is also a need to be flexible and adapt guidelines to specific clinical situations. For example, the infection prevention and control nurse may be called upon to give decontamination advice on a new piece of equipment, so they must be able to review and evaluate evidence and critically appraise cleaning and disinfection products.

Quite often, there will be grey areas in infection prevention and control. The infection prevention and control nurse will be basing their advice on risk assessments, founded on a knowledge of the microorganisms involved, transmission routes, and work flow in the specialism. The advice may depend on the situation and how much risk the hospital, as an organisation, is willing to take. For example, in the event of an outbreak, it is possible to close a ward or department completely to new admissions, potentially stop all planned surgery, tests, and investigations, and restrict visiting, etc. Unfortunately, a lockdown also has some undesirable consequences, including patients not receiving a prompt diagnosis and treatment. Isolating a patient may also have negative consequences for those with mental health issues, which may need to be taken into account. Individual ethnic and cultural differences and requirements will also need to be considered – one topical example of this is the matter of facial hair (often mandated by a person’s religion or culture) and FFP3 mask fit testing.

Another essential attribute is to be both a good communicator and to be accessible, so that you can provide on-going support. There is no better way of becoming known, and to know what is really happening in clinical areas, than to visit and talk to people. It is surprising the conversations one may have about issues and queries that may never have been aired in a more formal setting.

There is also a need for a tenacious personality and honed negotiation skills – it can sometimes take months or years to persuade people to change their way of working, even when there is have good evidence to support a proposed measure.

The role suits people who are comfortable working with different people across a range of settings and are able to network and seek out expert opinion, whether by asking an appropriate individual or by carrying out internet and literature searches.

An ability to review and evaluate evidence and critically appraise products is also essential, as some products claim to work wonders, when in fact studies may not have been aired in a more formal setting.

**“An ability to review and evaluate evidence and critically appraise products is also essential.”**

Infection control nurses are also responsible for training other staff members in infection control procedures.
Creating a safe space for patients and staff members in eye care facilities

The way hospitals are designed and used has a significant impact on efficiency and patient safety. In this article, we explain how to make buildings safer for patients and staff members.

People visit hospitals to get well. However, the potential for falls, accidents, cross-infection and exposure to hazards are high in hospitals due to the inherent complexity of hospital buildings, equipment, and procedures. Eye patients – especially those experiencing visual loss – may find it intimidating to come to a hospital, particularly for the first time.

Good hospital design should be people centric: it should put the needs of patients and staff members first. It should:

- Keep patients physically safe
- Reduce patients' anxiety
- Provide a comfortable and efficient working environment for staff members.

Building configuration and workflow

We need to recognise two important factors:

1. In an eye hospital, most patients tend to be visually impaired and elderly.
2. Some patients are likely to be the source of cross-infections due to other illnesses such as COVID-19.1

The hospital should therefore be designed to avoid overcrowding and make the patient's journey through the physical space of the hospital as easy and safe as possible (see panel).

Good signage is important as it helps patients to know where they are, and where they need to go next. Some hospitals employ people, or use volunteers, to guide patients through the hospital; this can help to improve the safety of patients who have visual impairment.

It is important to position the various services in the same order that patients would need them (e.g., registration, followed by visual acuity testing, instilling eye drops, slit lamp examination, etc.). This is also known as the 'workflow requirements'. A good understanding of the workflow requirements in an eye department or hospital, together with an appreciation of patient needs, will help when designing an efficient and safe hospital or making changes to an existing facility.2

Planning for growth

As a hospital's reputation grows, so does the number of patients and staff members. New equipment and procedures also require additional space. In these circumstances, it is important that additional spaces for outpatient services and operating rooms are set up next to, or very near to, those that exist already. This would ensure that building layout continues to mirror the workflow.2 Without detailed planning, expansion can involve duplicate equipment, duplicate staffing, and

Case study: Designing a better patient journey

In a large eye hospital in a South East Asian country, patients had to walk a significant distance from the registration desk to the area where visual acuity was being measured. Patients then had to walk back to registration and continue an equal distance in the opposite direction to be seen by a junior doctor. Next, patients had to walk up a flight of stairs to get to the refraction area, and then up another flight of stairs to speak to the consultant. The laboratories were on yet another floor. With this layout, the hospital seemed congested as patients were walking back and forth, in different directions. The irony was that there was more than adequate space on the entry-level floor to accommodate each of these services.

To improve the situation, the space was reorganised so that all the services were positioned next to each other, in the same order that the patients would be visiting them. As a result, the outpatient flow was a lot more efficient, it took much less time for each patient to complete their visit, and the hospital seemed more spacious. It would have been even more efficient if such optimal flow was planned when the hospital was designed.
more movement for patients. Insufficient allocation of space may also result in overcrowding and compromise patient safety.

**Friendly design**
Safety considerations in hospital buildings can go hand-in-hand with creating a friendly environment and an enjoyable experience for patients.

Courtyards, skylights, corridors leading towards points of visual interest or views, special niches or recesses for parking stretchers and equipment, and the use of colour and texture can serve functional needs and enhance patients’ experience of the space. Natural light, plants, music, and art can also make the hospital environment more enjoyable for patients and staff members.

**Keeping patients physically safe**
It is all too easy to accept things as they are and simply work around issues that are potentially unsafe for patients. We therefore recommend carrying out periodic reviews (ideally carried out by an external person) to identify potential hazards and address them proactively.

The following could serve as a checklist and/or guide.

**Preventing falls, slips and trips**
- Guard rails and barriers must be of sufficient height and strength in both interior and exterior spaces.
- Interior and exterior floor surfaces must have sufficient traction to prevent slips and falls.
- Ramps, stairs and corridors should be brightly lit and clearly visible.
- Avoid sudden changes in floor levels. Where this is unavoidable, put up a highly visible warning sign and mark the edges with high contrast tape or painted lines or, ideally, there should be a ramp with hand rails.
- Areas where water is used must have good drainage so that floors remain dry.

**Preventing collisions**
- All clear glass partitions must have visual barrier strips or designs to prevent anyone mistakenly trying to walk through them.
- Swing doors are preferable over sliding doors. People in a hurry tend to assume doors swing open, so they tend to walk into sliding doors. It is also easier to operate swing doors while pushing wheelchairs and trolleys.
- Doors need appropriate door furniture: handles if the door must be pulled, and a flat plate or a horizontal bar when a door has to be pushed open.
- Where two-directional movement is expected, there should be double swing doors with view panels.
- The speed and force of auto-close doors must be calibrated to avoid accidents.
- Avoid projections, such as low hanging sign boards, in areas used by people.
- Doors must not open directly onto stairs or ramps.

**Occupational health and safety**
- Task lighting should be appropriate for the task being carried out. Avoid glare on computer screens and work surfaces due to bright lights and windows. Adjustable blinds can help in controlling glare from windows. Good lighting ensures that labels and reports can be read properly and reduces the risk of error.
- Keep noise at an acceptable level. A quiet environment enhances concentration and productivity. Communication between patient and provider is clearer, less ambiguous, and more effective. External noise can often be reduced by closing the windows or doors, as appropriate. Fixing air-conditioning or fans can often reduce internal sources of noise. If echoing is an issue, use sound-absorbing materials like fabric or acoustic tiles.
- Position furniture, equipment, and cables to enhance ease of work and safety.
- Use and store all hazardous equipment as recommended. Proper safety warnings must be visible.
- Staff members working with potentially hazardous equipment, like lasers, must have appropriate safety equipment.
- Staff members need access to washrooms/toilets and areas where they can rest or socialise away from patients. This is essential, but often missed.

**Ventilation and indoor air quality**
- Maximize natural and cross-ventilation. Courtyards can bring natural ventilation and light into hospital buildings. Courtyards also act as social and spill-over spaces, are a great reference point for navigation, and connect the outdoors with the indoors. Courtyards can also expand capacity during emergencies.
- Where natural ventilation is not feasible, plan to use mechanical ventilation in accordance with local standards and requirements.
- Hospital air conditioning needs are very specific and may not be met by domestic units; it is therefore advisable to consult experts suppliers. It is also important to have optimal relative humidity.
- Use materials and furnishings that are low emitters of indoor air contaminants and volatile organic compounds (VOCs).

**Electrical safety**
- All electrical installations should be done in strict accordance with the respective country’s electrical safety codes.
- Good earthing increases safety as well as the life of sensitive electrical equipment.
- Integrate safety devices in the electrical system to prevent short circuits and overload.
Fire protection measures are sufficient. Checks are carried out to ensure that precautionary measures are in place. It is vital that buildings are planned with a consideration of the impact on an eye service and its staff members and patients. Although rare, fires, earthquakes, extreme weather, storms, heavy rain, snow, flooding, landslides, etc., must be handled. Set out clear guidelines or standard operating procedures (SOPs) to isolate, remove, and manage such materials.

Hazardous materials and waste handling
Hospital processes may use and or generate hazardous materials. Identify possible hazardous materials that need to be handled. Set out clear guidelines or standard operating procedures (SOPs) to isolate, remove, and manage such materials. Plan separate holding/storage areas for hazardous materials, away from spaces used by the public. The waste generated in hospitals, including contaminated materials, sharps, etc., require careful handling. Put separate, colour-coded waste collection bins in every area where waste is generated, as well as posters to encourage staff members, patients and visitors to separate waste at source. Position the bins so waste can be disposed of easily and the bins themselves can be removed safely. Dispose of contaminated waste according to local regulations. In the absence of such regulations, follow the practices advocated by the World Health Organization (see article on p.12).

Dangers, disasters, and security threats
Although rare, fires, earthquakes, extreme weather, and violence or security threats can have a devastating impact on an eye service and its staff members and patients. It is vital that buildings are planned with these threats in mind and that periodic mock drills and checks are carried out to ensure that precautionary measures are sufficient.

Fire protection
In areas where there are wild fires, maintain an adequate fire-break around the hospital building to prevent the fire spreading to the building. Fire-breaks are kept clear of vegetation (apart from short grass) and can be from 5 to 15 metres wide, depending on the height of the surrounding vegetation and local weather conditions. Modern hospital buildings use electromechanical systems and fossil fuels which increase the risk of fire. Fire protection engineers must be involved in all aspects of the hospital building’s design in order to ensure fire protection measures are in place. All building and fire regulations or codes must be adhered to. Exit paths should be clearly identified and kept clear of obstruction at all times. In multi-storey buildings, areas of refuge – a place to safely gather, before being rescued by fire personnel – should be designated and maintained. Proper fire detection, alarm, and suppression systems (such as sprinklers) can save lives and property. Emergency lighting and power systems should function and be kept in readiness at all times by carrying out regular checks and maintenance.

It is important to have fire-related information and signs clearly displayed in local languages. Regular fire drills and training of staff members should be given priority.

Earthquakes
Most national building codes specify the highest degree of earthquake resistance for hospital buildings. Hospitals not only have to be safe for their own patients and staff members, but should also be able to function fully to provide relief to injured people in the aftermath of an earthquake. If the hospital is built in an area where earthquakes can occur, experienced structural engineers must check the whether the building is able to withstand them.

All large and heavy equipment should be properly anchored at all times to ensure that they do not cause damage during earthquakes. Emergency preparedness for earthquakes should be part of the safety protocol of hospitals.

Storms, heavy rain, snow, flooding, landslides, etc.
Many natural and seasonal occurrences could create safety issues for hospitals. Selecting a good site – higher ground, away from flowing water bodies, well drained – will reduce the risk that extreme weather will affect the hospital building.

One may not have the luxury of an ideal site. Good engineering design could greatly reduce the risk of damage from extreme weather.

All equipment and systems that are meant to work during such eventualities, like storm drains, pumps, etc., must be kept in good in working condition at all times and located in areas that are unlikely to be affected by flooding and so on.

Security from human threats
Security risks could range from pilferage and theft to vandalism and terrorist attacks. Hospitals are open to everyone, and this makes it vulnerable to threats. However, the number of entrances could be planned, balancing functional needs, efficiency, and security concerns.

Surveillance systems should be planned without compromising privacy. The hospital can be designed so that patients and visitors are restricted to specific areas only. Quieter areas, such as parking garages and storage areas, should be closely monitored.
Safety during outreach activities in eye care

There are many risks to consider when offering eye care services outside of established eye care facilities. Risk assessment and careful planning will help to keep patients, staff members, and community members as safe as possible.

Outreach services are a popular means of providing eye care in remote and underserved communities. Due to their temporary and infrequent nature, and the need to adapt to changing local circumstances, outreach services may pose a greater risk to staff members and patients than services based at a health facility.

Organisations that are engaged in outreach activities such as mass drug administration (MDA) or surgical camps must carry out detailed assessments to identify risks, and then develop clear protocols and detailed safety guidelines to mitigate these risks; i.e., reduce the severity of their impact.

This article highlights what the likely safety issues are during outreach and how they can be addressed.

Planning
Planning an outreach visit must include carrying out a detailed risk assessment and putting together a risk mitigation plan for all the potential safety issues highlighted in the checklist (Figure 1). The organisation or hospital responsible for the outreach visit must ideally make one person, or a small team, responsible for carrying out the risk assessment, putting together a safety protocol for each activity that will take place during the visit, and providing training to every member of staff involved.

The outreach team must keep a printed copy of the safety protocol with them at all times, so that it can be referred to whenever the need arises.

Staff member safety
Staff safety and wellbeing is paramount for successful outreach services.

Basic accommodation and catering facilities – including electricity, water, and toilets – may not be available in remote outreach settings. Planning ahead for access to such facilities by prior arrangement is essential. For example, staff members may have to drive to and from the nearest town where such facilities can be found or pack provisions such as food and water or equipment for sleeping and catering.

Food and water contamination can be a major challenge for staff members during outreach visits. This can be avoided by packing your own food and water. Put together a clear plan for managing food contamination-related illnesses with essential medications such as antibiotics and/or rehydration fluid, or where to refer severely ill staff members if needed. Nearby health facilities that may provide support for such occasions need to be identified in advance.

Organisations must carry out detailed assessments to identify risks, and then develop clear protocols and detailed safety guidelines to mitigate these risks; i.e., reduce the severity of their impact.

This article highlights what the likely safety issues are during outreach and how they can be addressed.

“A printed copy of the safety protocol should be kept with the outreach team at all times.”

Ramasamy Meenakshi Sundaram
Senior Manager – Clinical Services: Aravind Eye Hospital, Madurai Tamil Nadu. India.

Esmael Habtamu
Chief Executive Director: Eyu-Ethiopia Eye Health Research, Training and Service Centre, Bahirdar, Ethiopia and Assistant Professor: International Centre for Eye Health, London School of Hygiene & Tropical Medicine, London, UK.
Some outreach settings may pose unpredictable security risks. In areas where unrest or violence is a possibility, it may be advisable to delay an outreach visit until stability is restored. If not, the following should be considered at the planning stage:

- Have staff members received the necessary safety training?
- Is a paper copy of the safety protocol available and kept with the outreach team?
- Are there any local authority services (or offices) to oversee safety, e.g., a community policing service?
- Is there access to a telephone or mobile network? If not, how could a possible safety issue be reported to the local authorities?
- How far is the outreach site from the nearest health facility that can provide emergency services?

Depending on the type of outreach, and the setting where it is being conducted, it is recommended that at least two team members work together at all times and that the outreach leader and the local security office/service are kept informed of their whereabouts and travel plans. This is particularly important if the outreach activity involves visiting community members in their homes. Pairing up male and female team members is advisable in areas where it is not safe or culturally acceptable for female team members to move around communities on their own.

Figure 1 Checklist for safe outreach

### Staff member safety

- Travel: vehicle is available and maintained, and there is access to petrol
- Accommodation and food arrangements are adequate
- Essential medications (including medicines and protocols for managing contaminated food-related illness) are available
- There is a facility nearby for referral in case of emergency, and staff members know how to get there
- Personal protective equipment (PPE) supplies are adequate
- A COVID-19 safety precaution guide is available
- Security checks and risk assessments have been carried out
- Safety training has been done
- A printed copy of the safety protocol is available and kept with the outreach team
- A telephone network is accessible
- Local security/police have been notified, and staff members have their contact details
- Staff members have been assigned to pairs for safety

### Patient safety

- Outreach site is centrally located and spacious
- Accessibility arrangements are in place for older people and people with disabilities
- Early village-level screening has been carried out and community members know when people from their village can visit the outreach site
- Safety arrangements are in place for people with age-related health issues
- Infection prevention protocols and arrangements are in place
- There is a protocol for managing complications
- Arrangements have been made for patients who need to be referred to the local health facility and those who have to remain for observation at the outreach site

### Community engagement and safety

- The community, local health care leaders, and political administrators have been involved in planning the outreach visit
- Waste disposal arrangements have been made, including how, where, and who is responsible for what

### Equipment safety

- Accountability checklist/form has been drawn up, stating who is responsible for which equipment, and to account for the equipment taken on the outreach visit - these must be returned at the end
- Plans are in place for transportation and storage of perishable consumables and medications e.g., medicines that have to be in a cold chain, for example) and other delicate equipment, such as operating microscopes
- Arrangements are in place for safe materials and equipment storage
- Arrangements are in place for cleaning, sterilising, and maintaining surgical equipment, including who will do it, when, and how
own (or in all-female pairs). Another reason to work in male-female pairs is that it will be easier for a male or female chaperone to be available when examining patients.

**Patient safety**

Outreach activities should ideally take place in a central location within the community, unless it is more appropriate to carry out home visits or door-to-door delivery of treatment. When selecting a location, it is important to consider the following:

- Who the outreach visit intends to serve
- The available space
- Safety and accessibility for elderly patients and people with disabilities

A central location should help to reduce the potential safety risks if patients and their families have to travel long distances.

Choosing a location with lots of space indoors will reduce the risk of accidents or falls due to overcrowding. It will also minimise the spread of respiratory infections and make it easier for older people and those with disabilities to move around. In resource-limited settings, schools often have more space and infrastructure than health facilities. If there are multiple classrooms, there can be one activity station (vision assessment, history taking and triaging, refraction, intraocular pressure measurement, final diagnosis & treatment advice, counselling, optical sales, etc.) in each classroom. This will reduce crowding and can make movement safer for patients, staff members, and volunteers.

During outreach, one of the major challenges is crowd management if there has been a good response to community mobilisation. Overcrowding may pose safety risks for older people, women, children, and people with disabilities, and it facilitates the transmission of infections such as COVID-19. Conducting village-level screening programmes a few days before an outreach camp, and allocating different days for each village to come forward, can help to avoid unnecessary overcrowding and the associated health and safety risks.

In cataract surgical camps, some older patients may have hearing, cognitive, or orientation impairments. It is important to remember that some patients are in danger of accidentally harming themselves. A system to identify, prioritise and protect such patients needs to be in place. A detailed process and checklist to ensure that every patient is accounted for and gets the intervention she or he needs, in a safe way, should also be in place.

Outreach facilities are not usually clean enough to safely conduct clinically invasive procedures, as they present an infection risk to patients. If such procedures are planned:

- Allow enough time for cleaning and disinfection of the outreach location before accepting patients
- Provide equipment and facilities for equipment sterilisation

“The purpose of the outreach visit must be clearly communicated in order to avoid, or directly address, any prior misinformation about the service.”

- Develop standard operating procedures for how and when equipment will be sterilised, and who will do it
- Develop a plan of action for managing expected and unexpected life-threatening complications.
- Prepare basic facilities and essential medicines in case patients need to be kept overnight; e.g., if they develop complications that need to be monitored.
- Provide safe transport for patients requiring referral and those with bilateral ocular shields/dressings after, for example, cataract surgery.

**Community engagement and safety**

Engaging with the community, and with local health care and political administrators, is an important step when organising a successful outreach visit. Such partnerships are needed in order to:

- Plan the outreach visit alongside the relevant stakeholders
- Address any safety issues
- Advertise the outreach service to the community.

The purpose of the outreach visit must be clearly communicated in order to avoid, or directly address, any prior misinformation about the service. Limited awareness among the communities being reached, and lack of engagement by local authorities, may lead to a lack of trust in the service offered, which will reduce attendance. Local authorities and leaders need to be notified of the service to be delivered, the number and type of professionals involved, their contact numbers, and the dates and location(s) where the outreach team will be working. Community stakeholders, including community volunteers (where they are available), and local officials need to take centre stage in the planning to ensure that dates are selected which do not coincide with local community events or religious festivals.

Waste created during outreach activities may pose a major health and environmental safety risk to the community if correct disposal is not planned and carried out. Waste disposal needs to be well thought through and responsibility for correct disposal allocated to a dedicated member of the team.

Further reading

1. Organising trichiasis surgical outreach – a preferred practice for program managers https://www.trachomacoalition.org/TrichiasisOutreach
3. Outreach services as a strategy to increase access to health workers in remote and rural areas http://digicollection.org/hss/documents/s19239en/s19239en.pdf
Safe management of ophthalmic health care waste

Health care waste must be collected, handled, stored and disposed of in such a way that it poses no risk to patients, personnel, or the public.

Hazardous waste relevant to eye health includes:

- **Sharps waste.** Used or unused sharps (e.g., hypodermic, intravenous or other needles, scalpels, broken glass)
- **Infectious waste.** Waste that poses a risk of disease transmission, e.g., waste contaminated with blood and other bodily fluids, laboratory cultures, and other materials that have been in contact with infected patients.
- **Pathological waste.** Human tissues, organs, or fluids.
- **Pharmaceutical waste.** Medicines and items contaminated by medicines.
- **Chemical waste.** Disinfectants, solvents, batteries, broken thermometers or blood pressure gauges, and laboratory reagents.

Incorrect management of health care waste can result in harm to patients, staff members, and the community. It can result in the unintentional release of pathogens (including drug-resistant organisms), pharmaceutical drugs, and toxic pollutants) into the environment. Disposal of untreated waste in landfill sites may contaminate water sources if the landfill is poorly constructed. The release of effluent water containing chemical disinfectants or commonly used laboratory chemicals (such as staining reagents used in diagnostic microscopy) can also pollute drinking, surface, and ground water sources.

Incineration can be costly and polluting, and improper incineration practices can result in low temperature burning. Low temperature burning will not destroy sharps waste and may expose health care personnel and the community to toxic compounds released from burning plastic and expired medicines.

Additional hazards can occur if people are scavenging at waste disposal sites and during the handling and manual sorting of hazardous waste from health care facilities. Waste handlers are at immediate risk of needle-stick injuries and exposure to toxic or infectious materials. Waste collection and storage areas on health care premises must be secure and access by unauthorised persons prohibited.

Lack of awareness about the health hazards related to health care waste, inadequate training in proper waste management, an absence of waste management and disposal systems, insufficient financial and human resources and the low priority given to the topic are the most common problems. Many countries either do not have appropriate regulations, or do not enforce them.

**How to manage waste**

Good practice begins with minimising the volume of waste generated in the health care setting through careful selection of consumables and processes, in combination with safe handling and the segregation of waste where it is being generated. Equally important is raising awareness and working towards improving local practice to attain national and internationally recognised safety standards.

Factors such as transportation, location and budget could influence how a health care facility will manage its waste. However, even in health care settings which have limited resources, it is essential that managing health care waste is viewed as a priority.

As a first step, it is important to determine if there are any national policies in place and, then based on this information, to create guidelines which are appropriate to both local facility and community needs and health care waste categories.

In larger hospitals, it is helpful to set up a waste disposal committee; in a smaller clinical setting a member of the infection control team will take on this responsibility in partnership with estates or clinic management. A survey or audit must be carried out to assess the both the volume and categories of waste generated by the eye care facility service before a waste management plan can be created and implemented by hospital/clinic management.

Health care waste must be collected, handled, stored, and disposed of in such a way that it poses no risk to patients, staff members or the public. Waste management protocols are needed for the collection and safe storage of health care waste both at ward level and storage in other areas within the eye hospital, eye clinic or health care premises. At a minimum, hazardous waste must be contained and separated from general waste. The use of colour-coding of waste packaging to clearly identify and categorise the type of health care waste before disposal simplifies this process. Table 1 gives the colour, type of container and collection frequency recommended by the World Health Organization (WHO) for different types of waste (Table 1).
Table 1 Colour coding, container type and collection frequency of waste recommended by the World Health Organization (WHO)

<table>
<thead>
<tr>
<th>Waste categories</th>
<th>Colour of container and markings</th>
<th>Type of container</th>
<th>Collection frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious waste</td>
<td>Yellow with biohazard symbol (highly infectious waste should be additionally marked HIGHLY INFECTIOUS)</td>
<td>Leak-proof strong plastic bag placed in a container (bags for highly infectious waste should be capable of being autoclaved)</td>
<td>When three-quarters filled or at least one a day</td>
</tr>
<tr>
<td>Sharps waste</td>
<td>Yellow, marked SHARPS with biohazard symbol</td>
<td>Puncture-proof container</td>
<td>When filled to the line or three-quarters filled</td>
</tr>
<tr>
<td>Pathological waste</td>
<td>Yellow with biohazard symbol</td>
<td>Leak-proof strong plastic bag placed in a container</td>
<td>When three-quarters filled or at least one a day</td>
</tr>
<tr>
<td>Chemical and pharmaceutical waste</td>
<td>Brown, labelled with appropriate hazard symbol</td>
<td>Plastic bag or rigid container</td>
<td>On demand</td>
</tr>
<tr>
<td>Radiological waste</td>
<td>Labelled with radiation symbol</td>
<td>Lead box</td>
<td>On demand</td>
</tr>
<tr>
<td>General health-care waste</td>
<td>Black</td>
<td>Plastic bag inside a container or container which is disinfected after use</td>
<td>When three-quarters filled or at least once a day</td>
</tr>
</tbody>
</table>

All staff members who come into contact with health care waste must be trained to know how to classify, handle and dispose of it safely and how to deal with any spillages. Anyone handling waste should have access to appropriate personal protective equipment (such as thick rubber gloves and aprons) that will help them to carry out their duties safely.

The WHO’s standards for health care waste disposal include the use of incineration and protected pits. On-site incineration is recommended for microbiological, pathological and anatomical waste. Laboratory waste known to contain pathogens should be autoclaved to render it safe before it is removed from the laboratory.

Alternative methods of waste disposal may be important in low-income settings that are unable to support high-temperature incineration practices. The use of protected pits is one example. These are deep, square pits within hospital premises that are topped by a reinforced concrete slab which is wider than the pit. The concrete slab has a smaller hole covered by a smaller piece of concrete which can be removed when filling the pit. Another option, recommended for sharps, is to insert a steel pipe (Figure 2) in the main concrete lid. Once the pit is full, the pipe (or the access hole) is permanently sealed.

Figure 2 A protected sharps pit

Waste chemicals need to be safely stored until they can be collected by specialist disposal companies. If such a service is not available, there may be alternative options, for example, filtering reagents through charcoal to inactivate chemicals, after which the liquid can be poured away into a drain. Alternatively, liquid reagents can be poured into a leakproof container of highly absorbent clay or crystal pellets (for example, those used for domestic cat litter). Used charcoal filters and pellets are hazardous waste. If hazardous waste is to be buried, it must be contained within a leak-proof container prior to storage in a protected pit.

Microbiological waste and sharps pose the greatest infection risk. Sharps are any medical device contaminated with blood, bodily fluids, or tissue and which can cause lacerations or puncture wounds. Safe handling involves correctly using and then discarding sharp items – at point of use – in specialised, robust containers which can be sealed for collection and disposal. Sharps containers must only be filled up to the indicated line (three-quarters full) and never overfilled; protruding sharps will compromise safe closure of the container. Heavy duty gloves must be worn by anyone who handles or transports these containers.

If incineration is not available, a full sharps plastic container can be filled with plaster of Paris, or something similar, to encase the sharps waste within the container, creating a solid mass that can be disposed of safely or buried. Automated machines which destroy needles by burning or cutting them can be used to render needles unusable and prevent needlestick injury (Figure 4).

Figure 4 An electrically powered needle destructor, Nepal

Further reading
Health care waste management is a major challenge in all eye hospitals. Hazardous hospital waste has a negative impact on the health of patients, health workers, and the local community. It is believed that 80–85% of eye hospital waste is non-hazardous and, if segregated properly at source, can be treated safely under normal conditions. It is the remaining 15–20% of hazardous waste for which proper disposal is challenging.

Hazardous waste is produced in the course of health care activities such as patient examination, diagnosis, and treatment. Examples from an eye hospital setting include used cotton swabs, eye pads, body tissue and fluids from ocular surgery, and sharps (needles, scalpels, wires, etc.). Non-hazardous waste is generated during administrative work, in the canteen, during cleaning/housekeeping, during construction and demolition, and when carrying out routine maintenance of hospital infrastructures.

Here we share our experience at Biratnagar Eye Hospital regarding safe waste disposal practices in a busy eye hospital setting. Biratnagar Eye Hospital is a high-volume eye hospital providing high quality yet affordable eye care services in the eastern part of Nepal. In 2019, 300,262 patients visited the outpatient department and 70,550 operations were performed.

**Where we started**
Prior to the implementation of safe handling and disposal practices at Biratnagar Eye Hospital, hospital waste was collected, without any segregation at source, by untrained staff members who were not protected with the appropriate PPE. This mixed waste was then transported, in an open rickshaw, to a holding area. Because the waste was not separated, the hazardous waste contaminated the non-hazardous waste, so that all the waste was now considered hazardous, and this meant that the overall volume of hazardous waste increased.

The waste was incinerated at irregular intervals in the hospital incinerator, or was removed every 1–2 weeks by the municipality waste collection service. The local municipality does not segregate waste; waste collected from hospitals and clinics is mixed in with household and industrial waste collected from different sources. All waste is dumped at the same municipality site. The lack of a safe waste disposal system increased the risk of infection and health related concerns to housekeeping staff members, patients, and the general public/community.

**An improved system**
Recognising the need to change towards safe waste disposal at Biratnagar Eye Hospital, a policy of health care waste management and standard operating procedures was formulated, taking into consideration national and international guidelines. A plan was prepared with the help of a hospital waste management consultant. We wanted to move towards achieving “zero waste” and a commitment was made to ensure that no hazardous waste would be transported out of the hospital premises without proper sterilisation. The plan included guidelines or the segregation, storage, treatment, and disposal of waste.

**Waste segregation**
A colour coding system as per guidelines from WHO was introduced. Bins placed in areas accessed by patients and visitors were accompanied by posters explaining good waste segregation practice. Needle destroyer machines have been installed within each clinic, and the main hospital storage area has separate collection chambers to enable correct segregation.
Staff training
Hospital staff members have been trained in proper waste segregation and disposal. Housekeeping staff who handle waste receive training in the appropriate use of personal protective equipment (PPE) and the safe handling, transportation, and treatment of waste.

As per WHO recommendations, the following PPE is used:
- Heavy-duty utility gloves
- Reusable plastic aprons (cleaned with soap and water, and then decontaminated with 0.5% sodium hypochlorite solution after each use)
- Single-use gloves made of nitrile or latex
- Gowns, which are discarded as infectious waste after each use (and not reused).

Hand hygiene is performed before donning and following removal of PPE.

All housekeeping staff have been immunised against hepatitis B and tetanus.

Transportation of waste
Following segregation, hazardous waste and non-hazardous waste is collected and transported, in closed bins, to collection sites several times a day, as required.

Treatment of waste
Infectious waste is sterilised in the waste storage area using an autoclave or sodium hypochlorite solution.

Biodegradable three-chamber pits were constructed for the storage and treatment of non-infectious biodegradable waste (such as food). After three months, biodegradable waste is converted into manure and is used as a compost for the plants in the hospital grounds.

Refresher training and regular monitoring
Newly recruited staff receive training as part of their induction and refresher training is provided for all staff as part of our regular hospital activities. Routine monitoring of the hospital waste management process is carried out daily by the HCW/HWM consultant. Reports are shared with the hospital waste management committee on a regular basis and improvements actioned as necessary.

Waste water and faecal waste management
Proper management of waste water (collected from different service) and faecal waste are significant challenges. Each day, around 100,000 litres of waste water and fecal waste are produced at Biratnagar Eye Hospital. We have established a Decentralized Waste Water Treatment System (DEWATS) which is designed to utilise environmental bacteria, plants, and gravity. DEWATS comprises different modules, ranging from settler to superior anaerobic systems such as baffle reactors, fixed-bed filters, and aerobic systems such as a planted gravel filter and collection chamber. When collected, DEWATS-processed water can be repurposed to irrigate farmland surrounding the hospital. Excess treated water is discharged into the public drainage system.

Environment-friendly equipment and instruments
Our hospital has adapted a policy of using environmentally friendly instruments and equipment wherever possible. For example, we have replaced mercury thermometers with digital thermometers, and replaced fluorescent tube lighting with long-lasting compact fluorescent light bulbs.

Zero waste and ISO accreditation
By the end of 2019, no hazardous waste was transported out of the hospital without proper treatment. During the year 2018 and 2019, a total of USD $1,889 was generated by the selling of sterilized waste (glass, bottles, and paper). In 2020, the hospital was accredited by ISO 14001:2015 in recognition of the organisation’s Environment Management System.

Enabling factors in the implementation of a safe waste disposal system

- A change in the attitude of, and continuous commitment by, the management team
- Identification of a ‘champion’ – a staff member who is interested and can take a lead
- Staff member involvement in the planning and implementation process
- Continuous training and refresher training of staff members
- Strengthening of the monitoring and feedback mechanism

The implementation of an environmentally friendly and safe health care waste management system at Biratnagar Eye Hospital was made possible because of a change in attitude and commitment from the management team, supportive leadership, and the involvement of many staff members.
Safety around medicines for eye care

The medicine prescribing and dispensing process is complex, and errors are relatively common. This article looks at the various issues around prescribing and dispensing medicines for eye care and how patients can be kept safe.

Many eye conditions are treated with some form of medicine, often requiring a prescription from an appropriately trained prescriber. The process is complex and errors can occur at any point along the pathway: from writing the prescription, to the patient instilling the correct eye drops, in the correct eye (as an example). Health care workers can and do make errors when writing prescriptions, and this has been well documented. One study in the UK showed that 7% of prescriptions contained errors.1 The researchers found that more experienced doctors, including consultants, were just as likely to make prescribing errors as their more junior colleagues. The same study showed that pharmacists intervened before most of the prescribing errors could affect patients.

Pharmacists can protect patients by identifying and correcting prescription errors.

Prescribing errors
Common issues or errors involving prescribing eye medicines include:

- **Wrong patient details added to a prescription.** This may result in confusion, delays, and patients being treated for a condition that they do not have (with a medication that may be unsafe for them) while others are left untreated for a condition that they do have.
- **Prescription written for the wrong eye.** For example, a patient has had surgery in their right eye but the topical steroid prescription is written for the left eye, leaving the patient without treatment to the eye that requires it, and potentially damaging the other eye.
- **Eye medications prescribed which are not available locally** (including those which are not on an agreed local formulary). This could include antimicrobial eye drops prescribed for a patient with a severe eye infection. Treatment for such conditions should start as soon as possible, but if the medication is not available locally the patient will not be able to start treatment in time.

- **Patient not advised about the expiry date of the product once it has been opened.** This can lead to treatment failure or worsening of the condition as a result of the patient using the preparation beyond the in-use expiry date.
- **Patient not advised about how to store the product appropriately.** This can lead to treatment failure or worsening of the condition as a result of the patient using the preparation after it has been stored incorrectly. Some eye drops should be refrigerated or kept cool; for example, chloramphenicol eye drops and ‘specials’ for more serious eye infections, such as amikacin and amphotericin B eye drops.
- **Preserved formulation supplied instead of preservative-free.** This can result in damage to the ocular surface. In some cases, this can worsen the condition that the patient is being treated for.
- **Wrong strength or dose.** For example, the strength of timolol eye drops is not specified on the prescription.
- **Poor communication with handover of prescribing responsibility.** This may lead to harm if, for example, patients are not issued continued prescriptions for a long-term treatment; e.g., if a community prescriber (such as a family practitioner) has received no communication from the hospital prescriber, and a patient on long-term glaucoma medication doesn’t receive their next bottle of eye drops after the one issued at the hospital runs out.

Continues overleaf ➤
How to avoid prescribing errors

The majority of prescribing errors occur at the stage of writing the prescription. Prescribers can reduce the risk of these errors by checking and counter-checking each prescription before issuing it. A study from 2013 found that there were 4.7% (29/623) prescription errors during a one-month audit period. Following a process of counter-checking, this was reduced to just 0.77% (5/651).

Therefore, prescribers should consider using a simple prescription writing checklist (see panel). These should meet at least the minimum legal requirements as well as other safety features, such as those recommended by the British National Formulary.

Dispensing and administering medicines

Nurses and pharmacists have very important roles to play in preventing harm from prescription errors and ensuring that eye medications, including eye drops, are given correctly, so that patients gain the maximum therapeutic effect and avoid harm.

Pharmacists are the final point of contact in the community, before patients take their medicines home, and nurses are the final point of contact before patients are administered their medicines in hospitals. They therefore need adequate knowledge and understanding of the relevant guidelines so they can identify potential errors and help patients to avoid them.

Consider the benefits of written information, in the form of patient information leaflets, to help with patient understanding. Where available, give these to patients when prescribing medications such as systemic steroids, as they can have severe and profound adverse effects which patients should be made aware of. Patients should also be given information about how to put in eye drops as this is something many patients find difficult. A previous article in this journal included...
a patient information leaflet on how to instil one’s own eye drops: https://www.cehjournal.org/article/instilling-your-own-eye-drops/

- Use a similar checklist to the one for prescribers (see panel) to help screen prescriptions for safety and appropriateness.
- As a safety precaution, two people should ideally check a medication before it is dispensed.
- If you are unsure what a medicine is being used for, what the correct dose is, or have any other concerns, then look it up in your local or national formulary and/or ask a colleague. If no local or national formulary is available, then a recognised standard can be used such as the British National Formulary (available online or in hard copy).²
- Develop the confidence to challenge prescribing decisions. Your ability to do this effectively could prevent patient harm. It may also help you to build mutual trust and productive working relationships with prescribing colleagues.
- Explain to the patient how they should put in their eye drops (or check that they know how to do this) and give them an instruction leaflet as a reminder (remember that some patients may not be able to read).
- Develop an effective mechanism for ensuring that the medicines you have in stock have adequate expiry dates. Arrange your stock according to expiry date and dispense those with the shortest expiry dates first. You can use paper- or computer-based spreadsheets to highlight when pre-packed kits such as crash boxes are about to expire.
- Eye drops, eye ointments, and eye gels have reduced expiry dates once opened, with many ‘specials’ having in-use expiry dates (expiry once opened) as short as 24 hours. Familiarise yourself with in-use expiry dates. This will also enable you to advise patients so that they can gain maximum benefit from the prescribed treatment.
- Become familiar with storage requirements of the medicines you work with to ensure that the integrity of stocked medicines is not compromised and that you are able to counsel the patient on the storage requirements.
- Hospital and non-hospital settings should be considered when administering topical eye medications.
- For instance, eye drops should be discarded after seven days and replaced if treatment continues in hospital settings. In non-hospital settings, eye drop bottles should be replaced every 28 days (or as directed by the information sheet).
- Nurses should ensure that the correct formulation of eye drops or eye ointment is administered at the correct time and strength, via the correct route, to the correct person, and into the correct eye.
- Nurses should advise patients against driving or operating machinery until their vision has cleared and/or their eyes have stopped stinging after administration of eye drops or ointment. This is particularly relevant when drops for pupil dilation are being instilled, as these can result in the vision being blurred for several hours.
- Nurses administering topical medication must keep careful record of topical drugs administration. Make accurate entries in the patients notes, as appropriate, in accordance with local and national guidance, e.g. those offered by the relevant professional body.
- Side effects and adverse reactions to medications should be documented in the patient’s notes and reported to the local/national reporting system, such as the Yellow Card scheme in the UK.

Paper-based prescribing vs electronic prescribing

Many health care units benefit from electronic prescribing and medicines administration (ePMA) systems that mandate entry of the above information. Most ePMA systems also provide clinical decision support (information to help prescribers make the right decision), which is individualised for each patient, such as highlighting allergies. ePMA systems have also been known to introduce problems alongside their numerous benefits. Prescribers have heightened expectations about what an electronic prescribing system can deliver, so are often surprised when they are found to have made an error that they expect an ePMA system would prevent. For example, not highlighting the need for a ‘once only’ loading dose for doxycycline prescriptions, leading to potentially slower onset of symptom resolution, or not mandating a review date or course length for steroid eye drop prescriptions, leading to inappropriate continuation of an acute prescription. ePMA systems vary widely in terms of their level of sophistication. However, regardless of their digital maturity,you will still have to view your patient as a whole and exercise good clinical judgement when using the information they provide to care for your patients.

References
5 Yellow Card reporting site in the UK. https://yellowcard.mhra.gov.uk
On World Patient Safety Day 2020, the World Health Organization (WHO) reminded governments that they have a legal and moral responsibility to ensure the health, safety and wellbeing of health workers and announced a Health Safety Charter (bit.ly/safeWHO), which calls on member states to:

1. Establish synergies between health worker safety and patient safety policies and strategies, including training programmes for all health workers and incident reporting systems.
2. Develop and implement national programmes for occupational health and safety of health workers to ensure that all health workers have regulatory protection of their health and safety at work.
3. Protect health workers from violence in the workplace. Violence in the workplace manifests as inequality, abuse, harassment, discrimination, stigmatisation and conflict in health care settings. Any form of violence against health workers is unacceptable.
4. Improve mental health and the psychological well-being of health workers. Many health workers operate in high-demand, high-risk and high-stress work settings for long hours.
5. Protect health workers from physical and biological hazards. Health workers face multiple physical, biological and ergonomic hazards, including exposure to infections, sharps, falls, radiation, chemicals, fire and electrical hazards, or musculoskeletal disorders due to poor ergonomics in handling patients and lifting heavy equipment.

The importance of staff health cannot be overemphasised. Health and safety risks to health workers can lead to risks for patients, including patient harm and adverse patient outcomes. Commenting on the role of health workers during the COVID-19 pandemic, WHO Director-General Tedros Adhanom Ghebreyesus said: “No country, hospital or clinic can keep its patients safe unless it keeps its health workers safe.” In this article we consider how this can be done at the facility or hospital level.

Clinical and non-clinical members of staff have daily contact with patients and/or infectious material, and health care workers are considered to be at significant risk of acquiring or transmitting hepatitis B, influenza, measles, mumps, rubella, and varicella. Immunisation of all staff members protects them against these diseases, and also prevents staff members from infecting patients. Vaccination is therefore an essential part of infection prevention and control programmes. It is the responsibility of the eye hospital or clinic, as the employer, to provide personal protective equipment (PPE) for staff members whenever there is a risk to their health or safety which cannot be controlled by other means. Always ensure that there is enough PPE available, that it fits well, and that the type and quality is suitable for the work being done.

Staff members may have underlying health conditions for which adaptations must be made. For example, health workers who are pregnant must be protected from hazards and risks in the workplace and offered suitable alternative work if it is not possible to carry out their normal duties safely.

**Injury prevention**

Injury within the workplace can take many forms. Prevention of sharps injuries (including needle-stick...
injuries) is a specific priority announced at World Patient Safety Day in 2020. Because of the risk of infection, these injuries can cause significant worry and stress, so make sure health workers have access to post-exposure prophylaxis as per the local clinical guidelines, as well as testing, advice, and counselling.

Another significant cause of injury in health care settings is associated with manual handling, i.e., lifting and moving patients, equipment, laundry, supplies, and waste. Neck and back pain are common among eye care workers due to the awkward angles and positions required during eye examination and surgery. It is important to minimise your risk of these occupational injuries in the long-term. You may need to adjust your position, your equipment, and the patient’s position to improve comfort. Where feasible, use ergonomically designed ophthalmic equipment and furniture to prevent eye injury, repetitive strain injury, and musculoskeletal injury. Equipment should only be used if it is functioning optimally and well maintained. In the office environment, keep all screens at eye level when seated.

A safe environment
All clinical facilities need to prioritise a safe environment, including:

- Access to clean water, sanitation, and hygiene
- Disinfection of the clinical environment
- Provision and maintenance of ventilation systems to maintain good air flow and a comfortable temperature within the workplace
- Electrical safety
- Reduction of excessive noise levels which could result in hearing damage
- Prevention of exposure to harmful radiation, such as X-rays.

It is important to ensure that services provided by external contractors are adequately monitored and supervised.

Protecting health workers from violence
Staff security is also an important issue, especially when responsibilities require lone working, as is the case for night shift workers and community health workers visiting patients in their homes. Consider how staff members can travel to and from home safely at night, as road traffic accidents may be more frequent during this period. It is advisable to provide safe transport where security is a concern.

Violence at work, including bullying and harassment, should not be tolerated or ignored. It is important to create policies and strategies to prevent and effectively manage concerns and events relating to any of these issues, for example, by setting up a supportive and confidential reporting system.

Aggression towards staff members by patients and members of the public should not be accepted. Set out standards of conduct for staff members as well as patients, relatives, and visitors to the hospital or clinic. Promote a culture of zero tolerance towards violence or aggression against health care workers, for example, by using posters to convey this message.

Improving mental health and the psychological wellbeing of health workers
Work-related stress and burnout are ongoing challenges for health care workers; this has been intensified by the additional pressures of caring for those affected by the COVID-19 pandemic and the disruption it causes to routine patient services. There are several things you can do to mitigate this:

1. Consider how to encourage and support staff members. Be aware that staff members may face all sorts of stresses outside the workplace; reassure them that this is normal and that they are supported. It may be helpful to offer staff members access to counselling or other forms of psychological support.
2. Optimise staff scheduling. Plan the length of shifts and the composition of the eye team to optimise workload and task sharing so staff members can take regular rest breaks and have time off work.
3. Establish a culture of learning instead of blaming. Develop a process whereby all staff members can confidentially report adverse safety events or near misses without fear of repercussions.
4. Set up a confidential reporting system where staff members can report any form of bullying or harassment that they experience in the work place.

Setting up good systems for safety
Good safety systems, backed up by documentation, play a vital role in creating a safer workplace for staff members and patients. Strive to adopt international and national occupational health and safety standards and keep up to date with local legislation.

It is the responsibility of health care management to create documentation for all clinical and non-clinical activities within the eye care setting that can have an impact on patient or staff member safety. These include risk assessments, standard operating procedures, inspection reports, and maintenance records.

Continues overleaf ➤
The aim of risk assessments is to eliminate, reduce or control the risk to patients and staff members associated with a procedure or activity. Standard operating procedures (SOPs) document safe systems of work.

As new infectious diseases emerge, SOPs must be revised to look for activities that can pose a risk to patients and health workers; for example, vision testing, refraction, slit lamp examination, and fundoscopy, to name just a few examples. SOPs should be reviewed and audited regularly.

Management is also responsible for creating robust systems that are well documented (e.g., posters in the staff room or in corridors) so that everyone knows how to respond to situations such as:

- Needle-stick injuries
- Accidental spillage, and harmful exposure to chemicals
- Health care associated infections
- Near-misses.

Injury and incident reporting is time sensitive and often requires immediate action, so staff members must know where and how to report these. It is also the responsibility of management to ensure there is mechanism in place for prevention (e.g., availability of safety boxes for disposal of sharps in every section of the facility) and compensation in case injuries occur, as per the local guidelines.

Training

It is important to offer regular training for staff members on how they can keep themselves safe. Take care to train all staff members, not just health care workers. For example, cleaning personnel and external contractors also need to be familiar with how infection spreads, how they may need to protect themselves, and what they should report. Recruiting staff champions to model good practice is a recognised approach to encourage uptake and compliance.

Practical tips for keeping safe at work

Heather Machin
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Manual handling

Always look after your body when you are at work. This means you must be careful when you are lifting or moving an object (including a patient) and/or making repetitive movements. Here are some tips.

- Store heavier items at an appropriate height above the ground i.e. not on a high shelf or a very low shelf, which can make it unsafe for users.
- Test a load to see if it is light enough before you attempt to lift or move it.
- Always ask for help if you must move or lift an object that is heavy or difficult.
- Position yourself close to the object you want to move as this will make it easier to move.
- Wear body braces (if available), such as lifting belts.
- Do not arch your back as you move objects. Keep it straight.
- Push rather than pull an item, as pushing takes less effort than pulling.
- To pick something up, bend your legs and use your stomach (core muscles) and legs to lift and push up – avoid using your back.
- Ensure you have good visibility, without adopting awkward positions, during these activities.

Avoid repetition injury

This happens when you keep doing the same thing, in the same position, for extended periods of time; for example, people in an office sitting at a desk and typing. The key is to prevent these movements leading to strains, aches and, in some instances, severe pain. Here are some suggestions on how to prevent repetition injury:

- Take regular breaks
- Move around (stretch your limbs) between tasks – take advantage of small breaks.
- Keep repetitive motions to a minimum. Making even slight alterations to repetitive tasks can reduce the risk of injury.
- Adjust your workstation to fit the task and your individual needs (e.g., change its height).

Use correct manual handling techniques to protect your back at work. MALAWI

Prevent needle stick injury

Health care workers are at risk of needle stick injury and it is important to adopt safe needle-handling practices. If you get a needle stick injury you need to immediately notify your manager and follow your hospital policy for needle-stick injuries and post-exposure prophylaxis against infection.

Here are some recommendations for prevention of needle-stick injury:

- Never re-cap a needle.
- Never take a used needle from the hand of another person. Instead, ask the person to place the sharp item into a needle container where it can be seen clearly.
- If you are the scrub nurse, never pass a needle or sharp blade to a surgeon when they are distracted, as it might harm them. Make sure you inform them that you are handing them the item so they can be alert and can safely take the item from you.
- Handle blades with a special forceps that is strong enough to grasp the blade for placement onto and off the handle’s shaft. Never use fingers.
- Only fill a sharps container to the fill line (two-thirds full).
- Never grab or stick your hand inside any bowl or container without looking first. Sharp items (i.e. suture-needles) may have been accidentally left inside.
Cleaning the operating theatre

Cleaning the operating theatre is an essential part of keeping patients and staff members safe. Here is how.

Cleaning the operating theatre and its immediate environment minimises patients' and health care workers' exposure to potentially infectious microorganisms.

Cleaning happens at various times:

- When preparing a new operating theatre
- Every day, before surgery begins
- Between patients
- After the last operation of the day (known as terminal cleaning)
- Deeper cleans are carried out once a week and/or once a month.

All areas must be cleaned: unrestricted, semi-restricted and restricted areas. Start in the operating theatre before moving to the scrub areas, anaesthetic and recovery rooms, and then the sterilising area. The toilet should be cleaned last.

Equipment

Cleaning equipment must be in plentiful supply. These should be a set for each for the operating theatre, the toilet, and ancillary rooms. Sets should be stored separately. Each set should contain the following:

- Mops and buckets
- Hard scrubbing brush
- Rubber pusher to remove excess water
- Disinfectant. Select disinfecting solutions with broad-spectrum microbicidal activity, which are appropriate for use on each type of surface that must be disinfected. Check with the pharmacy department what is available and use the best quality at an affordable price
- Absorbent dry and wet cleaning cloths
- Oil for lubricating equipment wheels.

The person doing the cleaning should change into a clean gown, cap, mask, and clean utility gloves.

Cleaning tip

Have one mop for the clean rooms and operating theatre and a separate mop for the dirty areas. Change the water between each area. It is good practice to place a cautionary ‘Wet Floor’ sign at the entrance of the room when cleaning starts.

Clean and disinfect the following:

- All flat surfaces (wipe from top to bottom, then from the centre outwards).
- The patient bed and its attachments, positioning devices, and patient transfer devices.
- Containers for sterile instruments, antiseptic bottles, and the trays in which these are kept.
- Scrub basins, taps, and walls. Check for any leaks.
- The soap and antiseptic solution bottles at the scrub basin (check that they are full and refill them if needed – this can be done the evening before if the operating theatre is temperature controlled).

Prepare waste bins by inserting colour-coded waste collection bags.

Finally, clean and disinfect the floor. Remove excess dirt and dust using either a mop or a hospital-grade wet vacuum, mop with clean water to remove soap residue, then mop using disinfectant. Take care not to agitate the dust, which spreads it.

Once the operating theatre is cleaned and disinfected, keep the door closed for 10–15 minutes with ventilation equipment turned on.

Clean all electronic equipment (e.g., phaco machines) according to the manufacturer’s instructions.
In between each patient
- After each operation, clean and disinfect any soiled areas of the floor as described previously.
- Clean and disinfect any furniture or equipment that came in contact with the patient or may have become soiled or damp, including the operating table, surgical lights, blood pressure cuffs, and tourniquets.
- Clean and disinfect the floor around the operating table (up to 1.5 metres away from the table).
- Collect and remove waste from the kick bucket and remove all other waste; replace all bin liners.
- Remove waste from equipment such as suction machines and clean, disinfect, or sterilise them, as appropriate.

At the end of the day, after surgery
- Use a cloth and hot soapy water to wash all surfaces, including the tops of operating tables and all stools.
- Switch equipment off at the mains. Wipe down electrical cables carefully using a cloth dampened with a small amount of alcohol or other disinfectant (to ensure minimal usage of fluid).
- Clean the legs and wheels of trolleys and tables.
- Clean operating microscopes and operating lenses after each theatre session. Do not clean microscopes or lenses using soap water, as soap residue can damage the lens. Use a soft, non-abrasive cloth for the lens and a cloth dampened with 70% alcohol or disinfectant for the microscope (as per the manufacturer's instructions), including the handles.
- Clean anaesthesia machines and carts, IV poles, and patient monitors.
- Change hand towels, patient sheets, and blankets in the theatre and toilet area.
- Clean the floor.

Other areas
- The toilets and changing rooms must be checked and cleaned throughout the day and separate cleaning equipment must be used for the toilets.
- Tea rooms and kitchens (and the recovery area, if food is given) must be cleaned and all leftover food and crumbs must be removed so that insects are not attracted to the area.

Weekly cleaning
- Remove all articles from shelves and clean all surfaces thoroughly using hot, soapy water. **Note:** Do not get sterile items wet, as this will make the packaging permeable and the items will therefore no longer be sterile.
- Wash the floor and apply disinfectant.
- Wash and dry instrument trolleys, including the wheels and the rungs.
- Scrub bowls and gallipots.
- Clean windows inside and outside.
- Wipe all high surfaces, such as the tops of cupboards and windowsills, with a damp cloth. This is to prevent the build-up of dust.

Monthly cleaning
- Move furniture such as cupboards or shelves away from the walls and clean the areas behind and underneath them. Clean the tops and the inside of cupboards, drawers and lockers. To prevent damage, remove all articles when doing so.
- Check expiry dates and rotate stock so that items with expiry dates in the near future are at the front.
- Clean trolleys, IV stands, stools, microscopes, etc., if needed.
- Wash curtains, if used in recovery areas, at least every three months.

Other considerations
- **Pest control.** Liaise with the administrator and the maintenance team to schedule regular pest inspections and/or control measures to prevent pests. Any control measures need to be carried out when the operating theatre is not in use. For example, schedule this to take place a day before the weekend or a festival. This allows time for the operating theatre to settle and for any issues to be rectified before it is needed again.
- **Air conditioning units and filters.** Ensure these are checked and cleaned. Change the filters as required.

**The ‘three-bucket’ system**

Disinfectants can be inactivated by the presence of any dirt or biological material (known as ‘soil’) on a surface. They may also interact with soap or detergent residues. For optimal results, it is important that a surface is visibly clean before applying disinfectant.

1. First, mop the floor (or wipe the surface) using a detergent and water solution (in bucket 1) to get rid of any dirt or grime.
2. Second, mop the floor (or wipe the surface) using plain water (in bucket 2) to remove soap residue.
3. Third, once the floor is dry, mop it using disinfectant solution (in bucket 3); for example, 1% sodium hypochlorite solution.

When mopping, start from the corner of the room and work towards the door. Back away from the cleaned area.
The Lancet Global Health Commission on Global Eye Health: key findings

More than 70 leading figures from 25 countries have contributed to the Lancet Global Health Commission on Global Eye Health - a wide-ranging report synthesising new and existing research across many aspects of eye health which was published in April 2021. This article series will look at the findings of the Commission in more depth, starting with a focus on the key findings.

February this year saw the publication of the Lancet Global Health Commission on Global Eye Health. The Commission is the work of an interdisciplinary group of 73 academics and national programme leaders and practitioners from 25 countries, co-chaired by Professor Matthew Burton from the International Centre for Eye Health (publishers of the Community Eye Health Journal) and Professor Hannah Faal from the University of Calabar, Nigeria.

**Key findings**

In 2020, 1.1 billion people were living with vision impairment, including blindness, and hundreds of millions more have ongoing eye care needs. Unless governments begin investing more in the people, equipment, and systems needed to deliver eye care, there could be 1.8 billion people living with vision impairment by 2050.

Blindness and vision impairment does not affect everyone equally. An estimated 90% of people with vision impairment live in low- and middle-income countries (Figure 1). Women, people living in rural areas, and people belonging to ethnic minority groups are also more likely to be affected.

The scale of this unaddressed need leads to a large economic cost globally, with analyses indicating that blindness, together with moderate to severe vision loss, currently results in US $411 billion in lost economic productivity. This is despite the fact that there are highly cost-effective treatments for most causes of vision impairment. In fact, over 90% of people living with vision loss would be able to see clearly after receiving cataract surgery or a pair of spectacles. Both interventions are highlighted in the report as being highly cost effective in many settings, particularly in resource-limited settings.

The Commission also examined the evidence that interventions to improve eye health can help to advance several of the United Nations’ Sustainable Development Goals. It highlights clear examples, such as the impact of cataract surgery on poverty reduction (SDG1) and the improvement of educational attainment (SDG4) following the provision of glasses to children with refractive error.

New thinking is needed to increase investment in eye health. In many countries there is a need to include eye health services in general health care, as part of Universal Health Coverage. This will require the integration of eye health into national health policies, financing, and health workforce planning.

Eye care services also need to be delivered as close to the population as possible. To do this, eye health must be included in general primary health services and secondary eye services must be strengthened. Working with communities as co-producers of health, expanding the eye health workforce to meet population needs, and integrating eye health teams into the general health care workforce can be powerful tools to strengthen eye care delivery and improve lives.

The rights of people living with vision impairment should be championed. We can do this by creating a more inclusive society and providing rehabilitation services, assistive technology, and accessible spaces. To help achieve immediate and substantial benefits for societies and people living with vision impairment, the report’s authors call on governments to urgently invest in eye health and to start rapidly improving lives and livelihoods by putting eye care in its rightful place on the global public health agenda.
Innovative tools to advance trachoma elimination in the context of COVID-19

Collaboration in the development and dissemination of new approaches, tools, and resources for mass drug administration is critical during the COVID-19 pandemic.

The COVID-19 pandemic has caused significant disruption to the delivery of health programmes around the world. In April 2020, the World Health Organization (WHO) issued interim guidance recommending the postponement of many health-related activities, including community-based interventions that are required to prevent and treat trachoma, the world’s leading infectious cause of blindness. This guidance was updated in July 2020, recommending programmes only be resumed after thorough risk-benefit analyses and an examination of a list of precautionary measures that should be applied with the aim of limiting the risk of transmission of COVID-19.

Initial analyses by the Neglected Tropical Disease Modelling Consortium projected that, without prompt action and intensified strategies, COVID-19 would disproportionately disrupt disease programmes that use mass drug administration (MDA) as an intervention, including trachoma and onchocerciasis. These neglected tropical diseases (NTDs) affect the world’s most marginalised communities and represent a major challenge to the achievement of universal eye health coverage. The report also projected that trachoma and onchocerciasis would be among the diseases that are more likely to have a resurgence, particularly in areas with the highest disease prevalence, due to the disruption of MDA treatment cycles and other interventions.

To ensure that progress towards universal eye health coverage is not stalled, despite the ongoing pandemic, the International Agency for the Prevention of Blindness (IAPB) launched a COVID-19 taskforce in June 2020 to share experiences, identify challenges, and provide guidance and support to health ministries to mitigate the disruption caused to eye health services. The taskforce identified many shared challenges across eye health delivery, including patient and staff safety, the postponement of interventions such as community-based surveys, active case-finding, and mass treatment campaigns, decreased human resources, disrupted supply chains, travel restrictions, and reduced uptake of interventions due to fear of attending health services. Together, these challenges represent a significant threat to the delivery of eye health services and have the potential to lead to increased vision loss and inequalities.

To assist eye health personnel working with health ministries, health professionals, and programme personnel, the taskforce collaborated with programmes, key messages, information, and resources specific to eye health and international development via its COVID-19 and Eye Health Knowledge Hub.

Similarly, in June 2020, the Neglected Tropical Disease NGO Network (NNN) launched a COVID-19 task group to bring implementing partners together to share experiences, lessons learned, and the tools being employed to support health ministries in the safe resumption of NTD programmes.

Risk assessment and mitigation (RAMA) tools

Health ministries and implementing partners have to make decisions about when and how to safely resume mass drug administration and other NTD-related activities during the COVID-19 pandemic. To support this, a WHO risk assessment and mitigation tool has now been adapted to create a suite of three Excel spreadsheet-based tools for risk assessment and mitigation, collectively known as RAMA. The three tools, developed with funding by United Kingdom Foreign, Commonwealth and Development Office, through the Accelerating the Sustainable Control and Elimination of Neglected Tropical Disease (Ascend) West and Central Africa programme, are available in French and English and cover treatment distribution (including MDA), disease-specific surveys, and – finally – case finding and surgical outreach. There are checklists and questions designed to help regional technical teams and health ministries to identify risk factors, consider how routine NTD activities can be adapted, and review the financial implications of adapting programmes so they are safe during the pandemic.
The RAMA tools have already been used in a variety of programmes across different settings. In the Ascend programme, the tools helped to identify a cost increase of 10–30% associated with programme adaptations such as additional handwashing facilities, active temperature screening, mask wearing, and additional community drug distributors to help with door-to-door drug distribution. They have also helped to identify areas that need improvement. In Ethiopia, RAMA questions helped the federal ministry of health to identify that many communities did not practice proper mask wearing and physical distancing, leading to the recommendation that national health authorities provide further health education to encourage the practice of all COVID-19 precaution measures. In Nigeria, the use of RAMA tools helped programme managers to better understand the benefits of digital platforms, such as WhatsApp and ComCare. These platforms have mitigated the communications challenges posed by restrictions on movement. Notably, community drug distributors took photos to document their adherence to guidelines, such as social distancing, and used these platforms to send the photos to the same supportive supervisors traditionally used during mass drug administration. The digital platforms were embraced by NTD communities in numerous countries to coordinate activities and share lessons learned. Mobile technology also allowed supervisors to access RAMA checklists remotely, which helped to monitor compliance to national COVID-19 guidelines during training and mass drug administration.

NTD Toolbox

Lessons from the United States Agency for International development (USAID) Act to End NTDs programmes have informed the creation of the new NTD Toolbox (www.ntdtoolbox.org). It contains practical approaches to applying WHO guidance to mass drug administration for NTDs in all 26 USAID partner countries across Asia and Africa. The resource provides information to guide communication and coordination for NTD programmes and includes diagrams that illustrate what implementing precautions could look like for different mass drug administration approaches, including distributing drugs house-to-house within a community, during school if the targeted population is school-aged children, and at fixed-point settings within a central gathering point within a community like a town square, mosque or church. It also includes practical approaches for training each type of health care professional within a central gathering point within a country, during school if the targeted population is school-aged children, and at fixed-point settings within a community. The NTD Toolbox also provides information on the importance of strong, resilient health systems that monitor eye health issues, training of health professionals to deliver interventions, and sustainable financing to support delivery and access to interventions and services. COVID-19 has demonstrated the importance of strong, resilient health systems and integrated comprehensive approaches to health. Although significant challenges remain to ensure that no one is left behind, the pandemic also presents new opportunities to forge stronger partnerships between trachoma programmes and the eye health community in our pursuit of vision for all and universal health coverage.

References


3. NTD toolbox. Available at: www.ntdtoolbox.org

“The development of several vaccines for COVID-19 provides new hope, but it is important that we are not complacent.”
Rhino-orbital mucormycosis following severe COVID-19 infection

A 49-year-old man presented with complaints of left-sided nasal stuffiness, peri-orbital pain and double vision. He did not have any other systemic complaints and was non-pyretic. He was known to have hypertension and diabetes, for which he had been taking oral medication for nine years, controlled based on random blood sugar testing at home with a glucometer (range of 140 to 200 mg/dl).

The man had recovered from COVID-19 just three weeks earlier; he had developed pulmonary involvement due to COVID-19. His inflammatory markers were also raised. He was treated with intravenous methylprednisolone 40 mg daily for 5 days, followed by oral prednisolone in tapering doses for 15 days, for moderate to severe COVID-19 disease. During this phase of treatment with IV steroids, the patient’s blood sugar values were uncontrolled and he was prescribed insulin to improve blood sugar control. One week after completing the course of steroids, he presented to the ophthalmology clinic complaining of double vision.

On examination, the patient had mild proptosis of the left eye (Figure 1) and a diagnostic nasal endoscopy was suggestive of an eschar in the nostril over the middle turbinate. A contrast-enhanced MRI of the paranasal sinuses and the brain (Figure 2) demonstrated left ethmoid sinusitis (arrow) with a medial orbital abscess that was not taking up contrast (*). A diagnosis of post COVID-19 invasive fungal sinusitis with orbital involvement, presumed rhino-orbital mucormycosis, was made.

**Question 1**
What are the risk factors for invasive fungal sinusitis in this patient?
- a. Recently recovered from COVID-19
- b. Known hypertensive
- c. Treated with IV steroids for COVID-19
- d. Options a and c
- e. All of the above

**Question 2**
Which tests and procedures would you perform next?
- a. Complete ophthalmic examination
- b. Fasting and postprandial blood sugar with HbA1C
- c. Endoscopic endonasal sinus debridement with medial wall decompression and drainage of the orbital abscess
- d. Send pus from the involved areas for microbiology and tissue specimens for histology
- e. All of the above

**Question 3**
MRI imaging (Figure 2) is suggestive of ethmoid sinus haziness with a focal medial orbital abscess without contrast uptake. What would you do next?
- a. Sinus debridement
- b. Sinus and orbital debridement
- c. Sinus and orbital debridement with local transcutaneous retrobulbar amphotericin B
- d. Sinus and orbital debridement with local transcutaneous retrobulbar amphotericin B with intravenous liposomal amphotericin B (dose of 3-5 mg/kg body weight)