Background

Purpose of the tools
The purpose of the quantification and costing tools for oxygen and pulse oximetry is to help procurement decision-makers and health facility planners understand the amount of oxygen or pulse oximeters needed to meet patient demand, and all costs associated with owning these devices over time. The tools:

- Allow the user to input their own data for the facility/facilities being planned for and leverage country-specific baseline data for six countries (India, Indonesia, Kenya, Malawi, Senegal, and Tanzania). Any other country can use the tool by entering their own data.
- Estimate the total oxygen or pulse oximetry need for a health facility or group of facilities.
- Outline oxygen delivery or pulse oximetry devices available to meet this need and their associated costs.
- Support planning and budgeting of custom device mixes and show associated costs.

Quantification overview
Planning for the long-term need of oxygen delivery sources or pulse oximetry devices can be complex. Within a single facility, this need may vary over time and is influenced by many factors, including number and type of beds, number of patients, clinical treatment guidelines, physicians' orders, availability of electricity, and more. This complexity grows when planning across multiple facilities. These Excel-based tools combine baseline data from market research and expert opinion with user data to approximate long-term need within a single facility or across multiple facilities.

Costing overview
Quantified need can be addressed through a variety of devices. Determining the optimal mix of devices often requires a holistic consideration of associated costs. Generally, associated costs can be broken down into two components: capital expenditure (CAPEX) and operating expenditure (OPEX). CAPEX refers to the total cost associated with purchasing and deploying devices and include the device purchase price, shipping, installation, training, and replacement units. OPEX refers to the total cost associated with operating the device over its useful life and include power, maintenance, refill, and spare part costs. These Excel-based tools enable procurement decision-maker to compare the long-term costs associated with different procurement choices to meet quantified need for oxygen delivery and pulse oximetry devices.

Takeaways

Oxygen delivery sources
Oxygen need in a single or group of health facilities can vary significantly over time and is dependent on bed use and patient volume. Additionally, different types of oxygen delivery devices (oxygen production devices vs. storage devices) must be planned for separately, and each type of device has unique considerations in terms of output. From a cost perspective, the division of CAPEX and OPEX for
various types of oxygen delivery devices is an important consideration. For example, gas cylinders require minimal up-front costs (CAPEX) but requires routine refill and distribution which incur relatively high OPEX. In contrast, oxygen concentrators and gas cylinder-filling plants have a much higher CAPEX, but OPEX costs, largely driven by electricity, are lower over time. This is a good example of why long-term OPEX should be considered, alongside up-front CAPEX costs.

Pulse oximetry devices

For pulse oximetry devices, both the type of device (fingertip, tabletop, or handheld) as well as how it is used (for spot check or continuous monitoring) are important considerations. The types of beds available in a facility/facilities will affect the both the number, type, and use case of the devices that are needed. Additionally, this breakdown of devices can affect the long-term cost structure. For spot checks, fingertip pulse oximeters have a lower overall cost than handheld devices. These fingertip pulse oximeters have a low CAPEX but much higher OPEX (driven by replacement battery costs). However, handheld and tabletop devices, which are mostly used for continuous monitoring, have higher CAPEX expenses due to the device and probe costs, while the OPEX represents a lower portion of the cost over time. Due to the large number of manufacturers in this space, both the CAPEX and OPEX (due to different power requirements) could vary substantially over time across specific products.

Impact

Although considerations will vary by region or facility, evaluating the need and the long-term costs for oxygen delivery sources and pulse oximetry devices can help procurement decision-makers make the best use of resources. These factors should not be considered in isolation, as many other factors go into device selection, including quality, performance, technical specifications, and availability of spare parts and maintenance support. Additionally, administrators may want to consider if specific devices are best suited for different levels of health facility, and then plan separately for each level.

With these tools, users can carefully consider long-term need and costs as part of the planning process. By planning appropriately for medical device need and maximizing the use of equipment that is purchased, a facility budget can be utilized most efficiently. Looking at long-term costs will ensure that decision-makers consider things like power sources and device maintenance over time, so that the appropriate budget and resources are allocated to these activities. Ultimately, better planning can lead to increased access to oxygen and pulse oximetry, benefiting across all levels of the health system.

For more information

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