PEOPLE THAT DELIVER

Promoting sustainable workforce excellence in health supply chain management

A new technique to model supply chain staffing to improve health outcomes

The Workforce Optimization Tool: an easy, powerful method to optimize your supply chain

Summary

Much progress has been made over the past decade in improving the national supply chains that deliver essential health products to patients in need. However, optimizing those supply chains – ensuring that they operate efficiently while delivering high-quality products where and when needed – remains elusive.

The Covid-19 global pandemic has brought supply chain, and those working in supply chain, to top of mind throughout the globe. Once the world transitions from a state of emergency and life resumes human resource planning for global health supply chain workers will be met with a new sense of urgency and importance within the overall health system.

This paper will examine the challenges in building a no-fail supply chain ecosystem and the trade-offs involved, especially in staffing to meet each country's supply chain goals. It will present a new, evidence-based tool to model optimum staffing based on custom-tailored key performance indicators and real-world constraints, e.g. funding levels and availability of well-trained staff.

Finally, we will present examples of how the tool is used and how decision-makers can access it to model various optimization strategies, thus informing their decisions on the best staffing approach to achieve optimum results.

The Challenge

Supply chains are vital for ensuring that patient populations receive needed health products at the right time, in sufficient quantity, and with assured quality. But what is a supply chain and how can you optimize it to ensure availability of products?

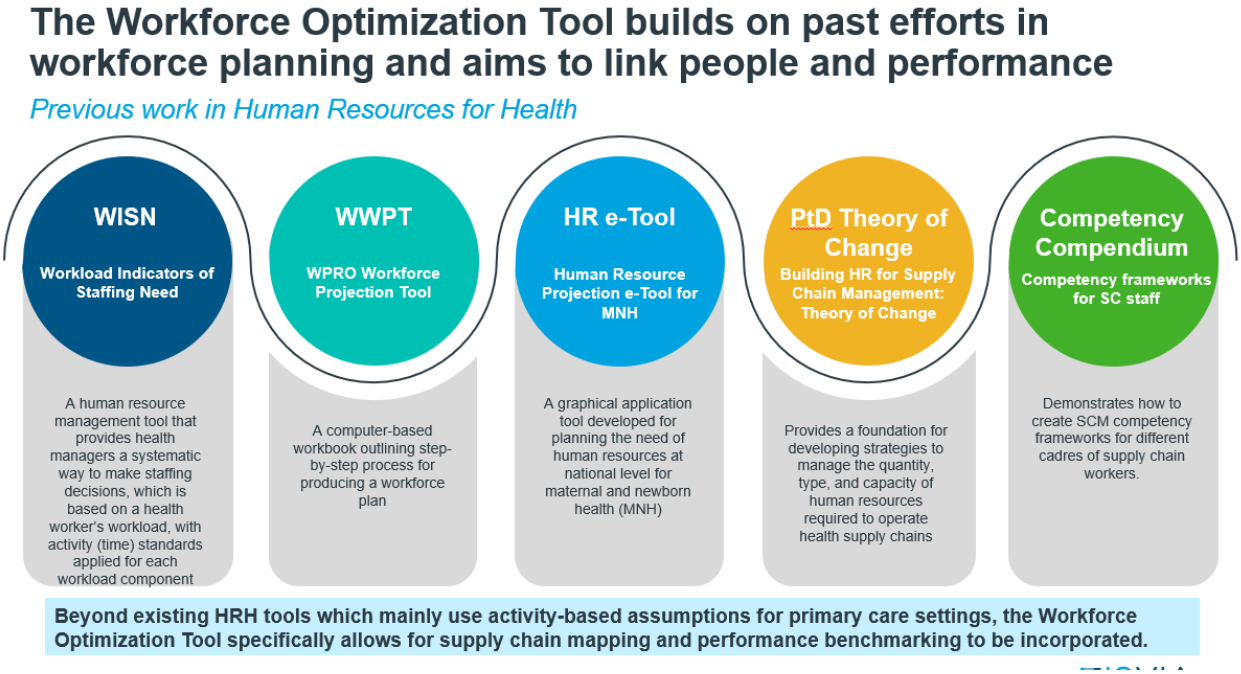
A supply chain is more than warehouses, trucks and carton boxes. It is in fact an ecosystem of organizations, people, technology, activities, information and resources aligned to deliver healthcare products from point of manufacture to patients in efficient and cost-effective manner.[i]

Designing, executing and managing such a supply chain is a difficult task. In 2018, global spending on medicines reached $1.2 trillion and is expected to exceed $1.5 trillion by 2023.[ii] To ensure these

medicines reach their intended recipients, donors have provided significant funds to improve supply chain infrastructures and develop technologies to increase effectiveness and efficiency.

This donor support has gone to resources to better manage the global health workforce. The tools and resources created focused on how best to staff health care providers and rarely focused on the allocation for supply chain staff. The majority of the staffing tools were built on a volume and capacity framework and were focused on ensuring that there were enough staff to serve patients. For example, the Workload Indicators of Staffing Needs (WISN), is a human resource management tool that provides health managers a systematic way to make staffing decisions, which is based on a health worker's workload, with activity (time) standards applied for each workload component.

In addition to WISN, the other tools in the global health space were the WPRO Workforce Projection Tool, which was a computer-based workbook outlining the steps for producing a workforce plan. There was also the HR e-Tool which is a graphical application tool developed for planning the need of human resources at the national level but is limited as it only focused on maternal and new-born health.



Graphic 1: **past work done by the global health community that the workforce optimization tool builds on**

These investments from donors and governments have allowed the development community to provide technical assistance and other solutions to increase the maturity of supply chains and the expertise of their workforces in developing countries.

The Solution: People that Deliver Engage IQVIA to improve supply chain staffing

Given the importance of supply chain activities in public health, People that Deliver (PtD) was created in 2011 as a global partnership of organizations focusing on enhancing the professionalization of supply chains through a systematic, evidence-based human resources methodology.

PtD is based on the global recognition that without trained professionals to manage the health supply chains, medicines and other health supplies will not reach patients in need. PtD is governed by a board representing governments, international donors, multilateral agencies, nongovernmental organizations, academic institutions, professional associations, and private companies.

Based on its work with individual countries PtD was concerned that supply chain staffing shortages[1], and misallocated staff, could be contributing to gaps in treatment as well as stock outs at the service delivery point. PtD wanted to provide the community with a resource that went beyond existing HRH tools which mainly use activity-based assumptions for primary care settings. They hypothesized that if managers had a tool to take into account these two factors as well as volume and capacity, managers could create staffing plans that were optimized to improve health outcomes and supply chain performance.

PtD engaged IQVIA, a global biopharmaceutical services company, to help solve this problem. PtD selected IQVIA because of its decades-long expertise in modeling the staffing needs of thousands of biopharmaceutical companies, from global MNCs to emerging companies, around the world. These projects typically involve two elements: understanding where to put resources based on demand and determining key performance indicators to staff for optimize efficiency.

In addition to each organizations' vast prior experience, the project involved conducting interviews with key stakeholders in Pakistan and Nigeria. All this information was used to develop a new tool that applied previously validated methodology but took it further by allowing for health outcomes and supply chain performance metrics to be incorporated into staffing plan models.

The Workforce Optimization Tool, an easy, powerful way to model supply staffing under various scenarios

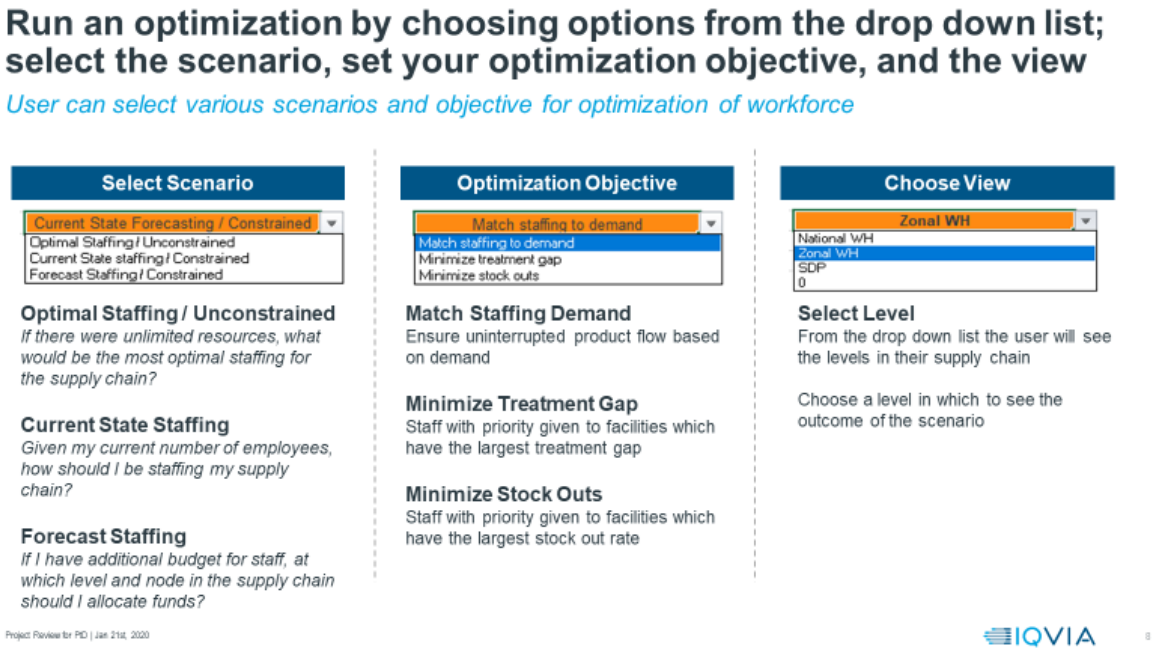
PtD is created an intuitive, easy-to-use Excel-based public good that can be used to allocate supply chain workers based on differing objective functions. The tool is dynamic, easy to use, and can be used for tactical as well as strategic decision making.

The Workforce Optimization Tool is different from other tools the supply chain community has seen because it allows users to set *different objectives* to improve supply chain performance and/or health outcomes, as well as staff for demand. This provides managers with an easy-to-use tool to model various scenarios based on local needs and resources.

[1] In creating the tool and this paper, we searched for data to support the hypothesis that that staffing shortages could be contributing to health outcomes and poor supply chain performance. However, in our research, we found minimal supporting evidence of this hypothesis. We aim that through this tool we can generate supporting data to better support supply chain staffing.

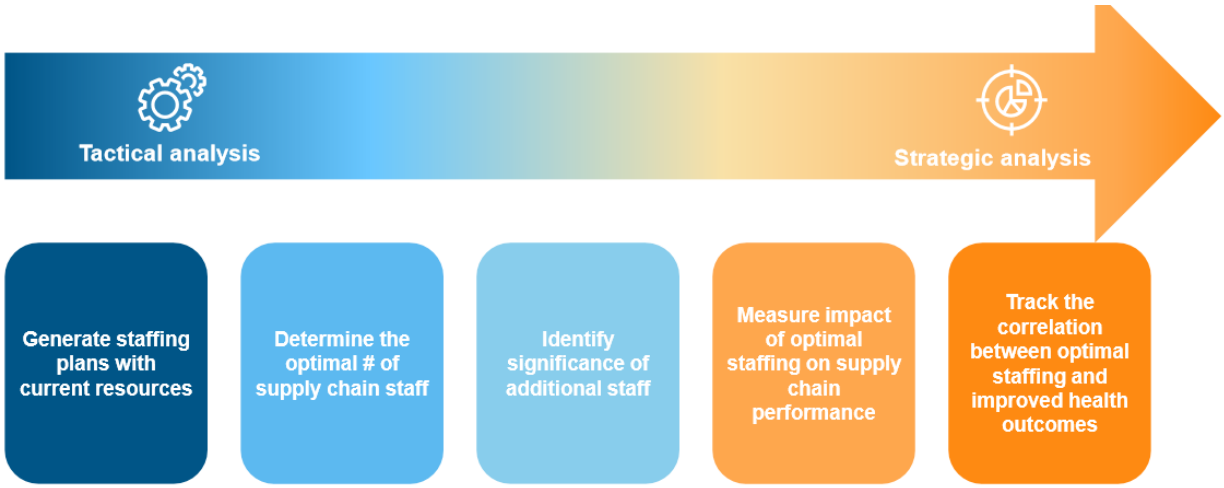
PtD focused on creating a resource that can optimize for three main objectives;

1. Match Demand
2. Minimize Stock Outs
3. Minimize Treatment Gaps



Graphic 2: further details on constrained vs unconstrained use cases

The tool is built on the assumption that stock-outs (an event that causes inventory to be exhausted) and treatments gaps are caused by the lack of supply chain personnel to move product. The model was built with an aim to more completely understand the supply chain staff's impact on health outcomes and supply chain performance. It is important to note, that because supply chains are complex ecosystems there can be many other reasons besides inadequate staffing for these gaps. However, this is a strategic tool and provides an opportunity for supply chain managers to look at the effects of staffing on their performance indicators and make needed adjustments. The tool can be used to facilitate discussions and measure the impact of resource allocation on the overall supply chain.



Graphic 3: additional suggestions for use cases

As mentioned in the above, the tool can be used as a strategic and tactical tool. With all models, the data that is inputted into the tool will dictate the data that is generated from the tool.

Please refer to the following examples for potential use cases of the tool.

Example 1:

A warehouse manager wants to decrease order lead-time and is curious to see if this can be done through better staffing. Please note, order lead-time is defined as the average time it takes for customers to receive their orders once they are placed.

The manager starts this analysis by entering all the critical input data into the tool. For the Supply Chain Performance Indicator, the manager inputs order lead-time rates. Data collected via spreadsheets on order lead-time covers a two-year period, and the manager has reviewed the data and is confident about the averages. After entering all the data, the manager selects which scenario to run via the Output Scenario Planning tab. The manager chooses a constrained scenario based on the current number of employees.

After selecting the level the manager can see where staff should be placed in order to minimize the order lead-time. The manager compares the recommended staffing with current staffing and uses the tool to decide about staffing. The manager staffs at recommended levels for six months and continues to measure order lead-time to understand any outliers.

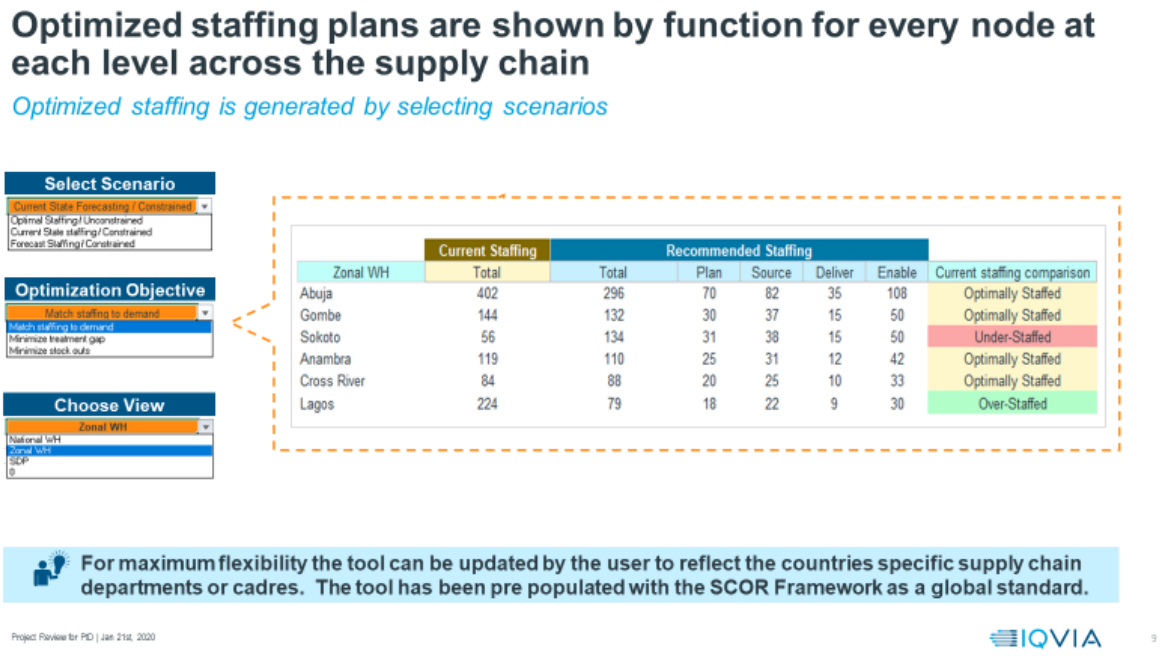
Example 2:

A Ministry of Health analyst is preparing a grant for a large donor and would like to show the potential impact of increased staffing and training impacts on HIV health outcomes. The analyst starts by entering all the critical input data. For the Treatment Gap Indicator, the input is HIV prevalence and the current number of patients receiving treatment through the national supply chain. The model assists the analyst in calculating the treatment gap.

After entering all the data, the analyst selects which scenario to run on the Output Scenario Planning tab. The analyst chooses an unconstrained scenario with the optimization tab set to "minimize treatment gap" for the HIV clinics in her supply chain. After selecting the level, the analyst can see where staff should be placed in order to minimize the order treatment gaps. The Workforce Optimization Tool will *not* tell the analyst what the treatment gap will be; instead it provides recommended staffing in an unconstrained environment. The analyst can then run a "constrained" optimization based on expected funding from the donor to compare the unconstrained and constrained scenarios.

The analyst uses the unconstrained and constrained staffing to formulate a staffing and training budget number and includes the analysis in the request for funding.

As referenced in graphic 2, the Workforce Optimization Tool allows for constrained and unconstrained analysis. This is exceptionally helpful in scenario planning, as we saw in Example 2. The ability for the user to compare unconstrained with their constrained outcome can help determine how far from the ideal state staffing can be. In addition, the Workforce Optimization Model allows for the user to enter their current staffing model, and uses this information in the output scenario planning tab. Through this lens the user is able to see if there supply chain is optimally staffed. For technical questions on this calculation please see the FAQ document.



Graphic 4: view of optimally staffed vs under/over staffed

Data requirements for the Workforce Optimization Tool

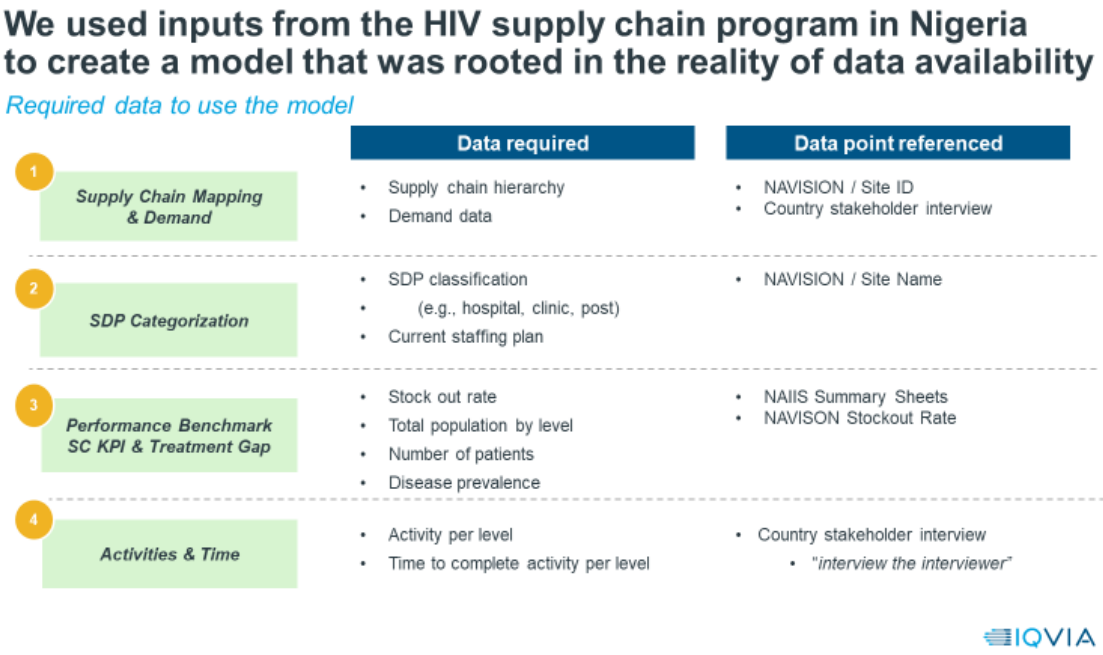
The Workforce Optimization Tool requires three phases of input in order for the user to generate an outcome. Just like the other tools, the amount of time and effort to collect good data will be reflected in

the output generated by the model. The tool considers supply dependencies, demand, workload activities, and capacities to recommend a staffing plan at each node of the chain.

We will now review the data requirements for the Workforce Optimization Tool inputs, for more detailed information please review the model and FAQ. If a supply chain manager is interested in using this tool to conduct similar analysis, they will need to input the following data. Managers should ask themselves these questions as they review this list:

1. Is this data available?
2. If not, what data is available that could be used as a proxy?
3. How granular is the data, i.e. its level of detail and preciseness?

In order to guide the user through the model instructions have been embedded in the excel tool. Additionally, a user guide is provided to help managers input data and run staffing scenarios.



Graphic 5: overview of the data required

The data inputs

Supply Chain Mapping and Demand

In Phase 1, the user will be asked to input the supply chain hierarchy. This is the network in which goods flow through the supply chain to the patients. When mapping the supply chain, the user should consider the product portfolio for the supply chain to ensure they are mapping specific product flow for which wish to use in their health outcomes. Additionally, the demand should also reflect the product portfolio. In other words, if your aim in using the model is to understand your staffing in order to minimize an HIV Treatment gap then you should map the HIV supply chain and use the HIV consumption data.

SDP Categorization

The creators of the model understood that not all service delivery points are staffed the same. They build the tool with the option to further categorize and segment SDPs based on the needs of the supply chain. For example, if the user want to understand how many inventory specialist should be staffed in the TB supply chain across rural and urban hospitals they could further segment their hospitals for a more detailed result.

Supply Chain Performance

The model has been preset to collect data on stock out rates. However, any key performance indicator can be reflected in the model. The user should collect the stock out rate for the nodes at the level closest to the patient. However, we know that this is difficult at times and the model is flexible to adjust to your supply chain requirements.

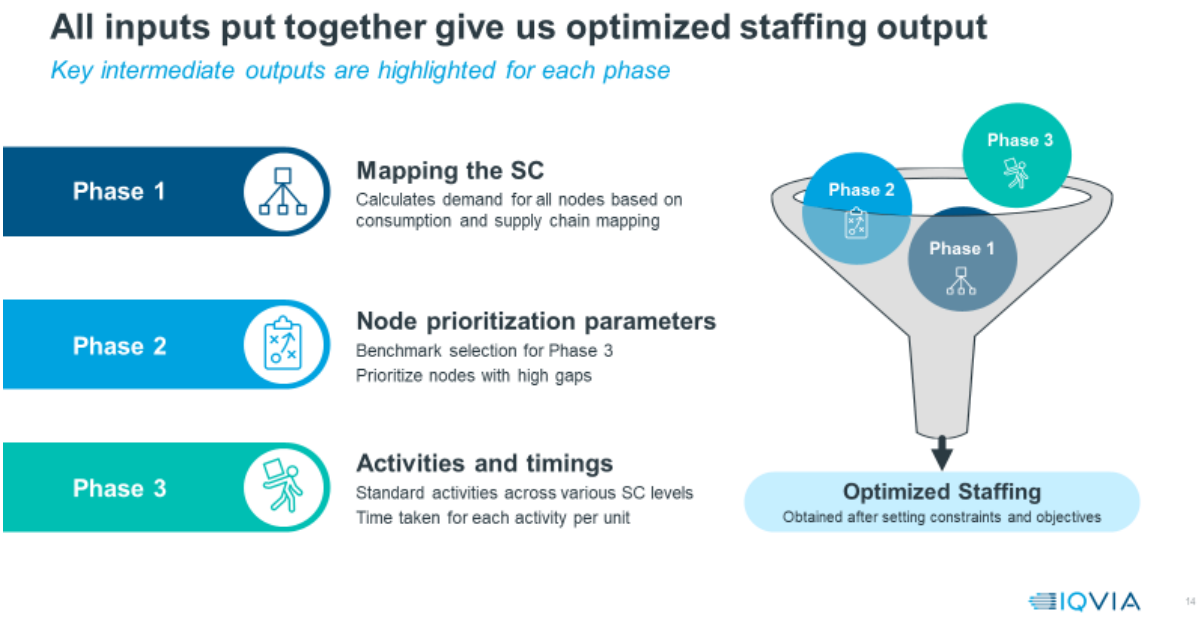
This feature was a late addition to the model, PtD decided that giving the opportunity to the user to optimize for supply chain performance and compare that with optimizing for treatment gap would be an interesting analysis for users to conduct. The user guide will walk the user through the specifics on how to do run both analyses.

Treatment Gap

The model was created with the aim to calculate treatment gap. Because this is not a commonly captured metric in the supply chain the model was built with extra support to walk the user through the calculations. The user will need to do pre-work outside the model to collect prevalence and population data. It is important to call out, that the prevalence used in this section of the spreadsheet should match the demand used previously.

Activities and Time

The last input into the model can be the most cumbersome depending on the user's aim. Just like the models in the past, these inputs help with activity-based staffing calculations. The user will first need to speak with experts through the supply chain to understand what activities are taking place at each node and what is the number of hours spent per activity. This is a rather complex project and should be done prior to starting the model. There are many global health partners within the community who can assist supply chain managers in the best methodologies to gather this information.

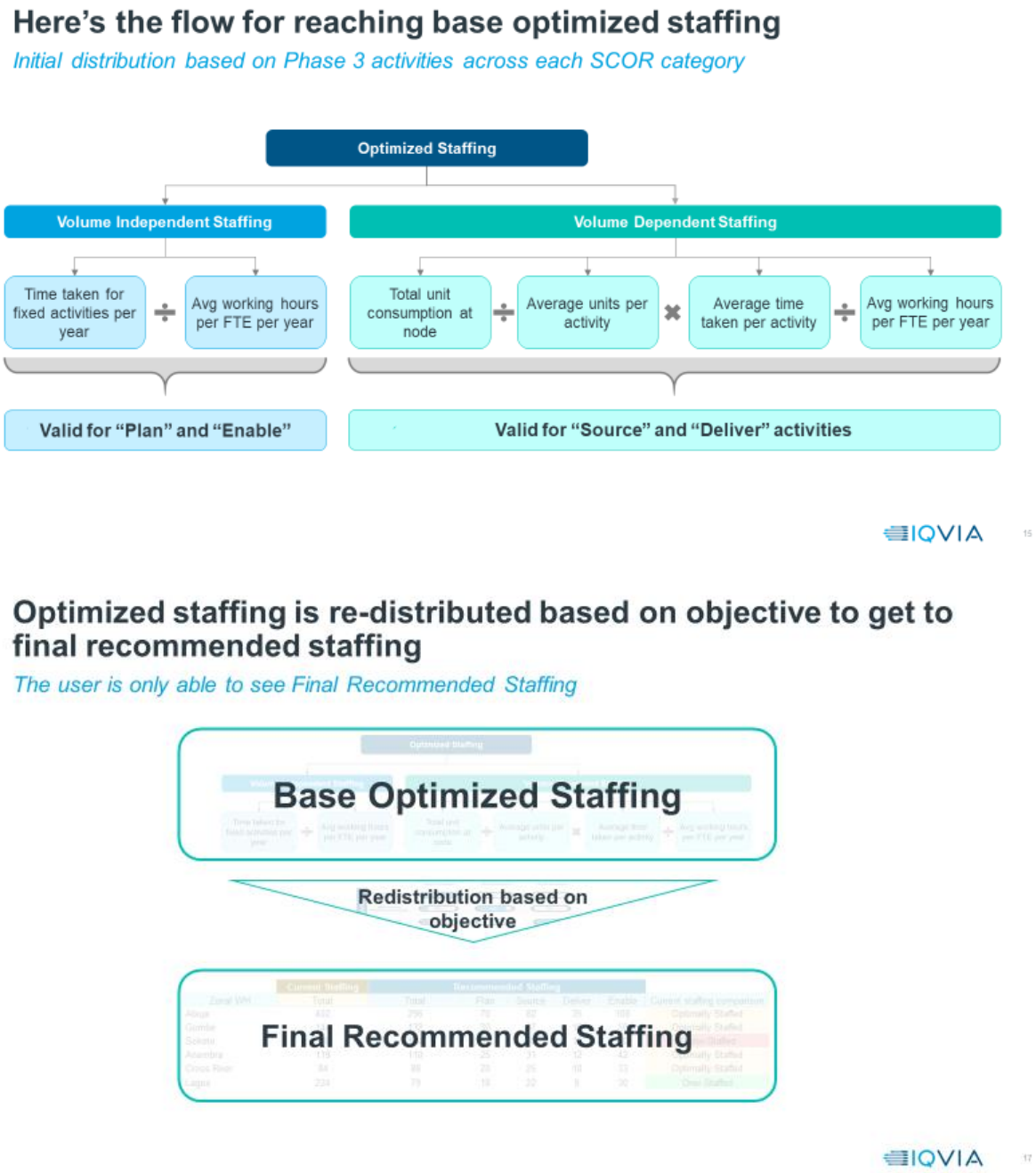


Graphic 6: visualization of the data inputs

The calculations

Once the data inputs have been entered into the supply chain the user is then ready to move to the output tab and to set their calculations. We have presented how to use the scenario setting and objectives for optimization earlier in the paper.

In order to reach the optimized (unconstrained) staffing the model does a baseline calculation that is then takes into account the distribution set by the user to generate the outcome.

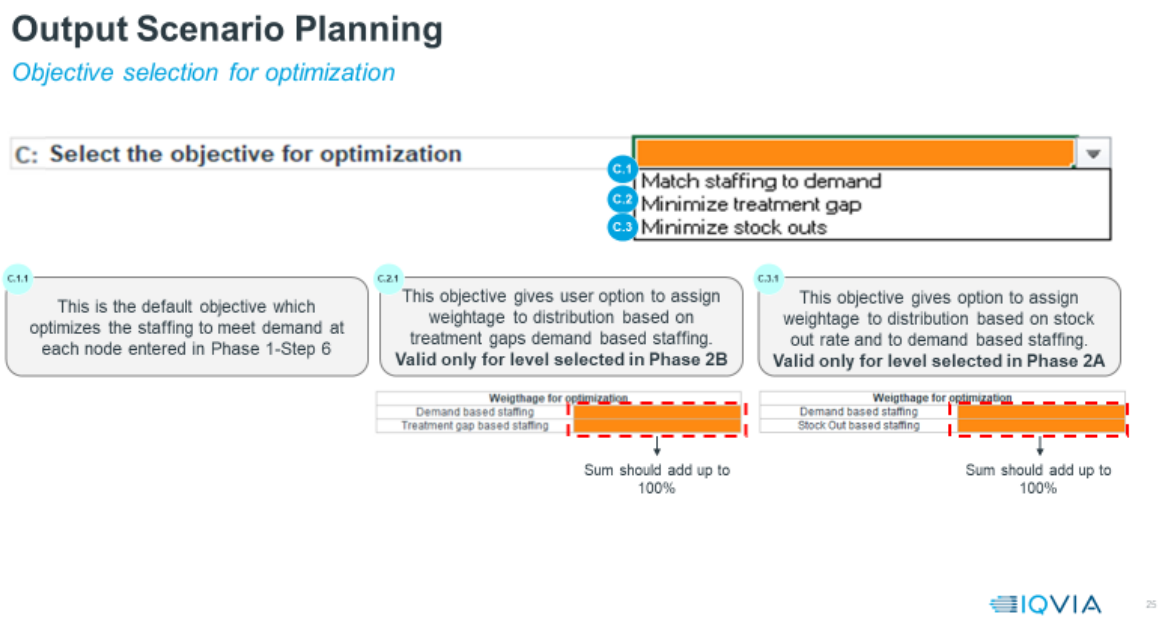


Graphic 7: calculation

Feature call out

A secondary objective of this tool was to create an opportunity for supply chain managers to further develop their knowledge of the supply chain. In the scenario planning tab of the tool, there is an opportunity for supply chain managers to run various scenarios and compare the results with their

current staffing, as well as against previous ran scenarios. We encourage supply chain managers to use the tool stress test solutions to difficult problems, and most importantly share their learnings, analysis, and solutions with the wider global health community.



Graphic 8: visual of objective optimization setting

Conclusion: The benefits of using the Workforce Optimization Tool and how to get started

The benefits of using the tool are multifold. It allows users to model different scenarios quickly, cheaply and with confidence. The tool was built using decades of experience in optimizing staffing for the biopharmaceutical industries but taking it to a new level of by using real-world data and complex algorithms to yield valuable insights.

The tool allows innovation to be modeled with no risk to existing supply chain ecosystems. Once an approach has been selected, supply chain managers can quickly and efficiently implement staffing changes with confidence. The combination of flexibility and ease of use, at low risk, promises significant benefits to improving the efficiency of supply chains in improving health outcomes.

To learn more about obtaining and using the Workforce Optimization Tool in your organization, please contact the People that Deliver initiative at, info@peoplethatdeliver.org.

[i] Prashant Yadav (2015) Health Product Supply Chains in Developing Countries: Diagnosis of the Root Causes of Underperformance and an Agenda for Reform, Health Systems & Reform, 1:2, 142-154, DOI: 10.4161/23288604.2014.968005

[ii] https://www.iqvia.com/-/media/iqvia/pdfs/institute-reports/the-global-use-of-medicine-in-2019-and-outlook-to-2023.pdf?_=1584082654677