Global Health Forecasting Working Group
Consultation Report

EXECUTIVE SUMMARY

Whether global health programs reach the people who need them and save lives depends, in large measure, on whether critical medical technologies are available when and where they are needed. With increased donor assistance, and new and more costly pharmaceutical products for developing countries, weak links in the global health supply chain are limiting on-the-ground access to essential products to prevent and treat AIDS, malaria, childhood illnesses and other health conditions. Demand forecasting – the process of projecting which products will be purchased where, when and in what quantities – has emerged as a key challenge in the supply chain, reflecting the problems of limited information about demand for both existing and future products (by individual countries and in the aggregate), and uncertainty about domestic and donor funding. Shortcomings in demand forecasting increase the risks for suppliers, resulting in higher costs, supply shortages and concerns about the long-term viability of investing in R&D for health products that would benefit the developing world. Demand forecasting also limits donors' and national health programs' ability to spend their aid dollars effectively to improve public health and save lives.

To address this important issue, the Center for Global Development convened the Global Health Forecasting Working Group to generate critical thinking about the magnitude and nature of the challenges of demand forecasting for critical medical technologies; the ways in which demand forecasting could be improved; and the specific actions and investments by international actors to improve global demand forecasting, particularly for products entering new markets, procured largely with external funding. The group's findings and preliminary recommendations are summarized below; more detailed analysis is presented in a consultation report for external feedback.

FOCUS OF ANALYSIS & RECOMMENDATIONS

The Working Group focused attention on aggregate demand forecasts, which seek to capture global demand and are used for high-level planning by manufacturers, procurement intermediaries and funders. The group looked specifically at the challenges of forecasting for "new products and new markets" – that is, those products that are newly licensed and/or are new entrants into use in developing countries. This scope was adopted because the challenges of demand forecasting – and the consequences of demand uncertainty – are most pronounced for these products. Throughout the group's work, efforts were made to distinguish between forecasting-related issues that are specific to a particular medical product or class of products, and issues that are common across all or most new products. Recognizing the many product-specific activities now underway through a set of public-private partnerships, in developing recommendations emphasis was placed on identifying strategies that would work across a range of products, and that would promote economies of scale and scope.

THE DEMAND FORECASTING CHALLENGE

Aggregate demand forecasting serves five critical functions in the market for global health products and the effective delivery of medicines and supplies, all of which add up to lives saved:

1. **Essential products are available because there is enough supply to meet demand**. Allows manufacturers to plan and invest in manufacturing capacity, ensuring sufficient supply to meet demand and taking advantage of production efficiencies.
2. **New products are developed because there is a realistic picture of future markets.** Provides manufacturers with information about new market potential, permitting them to efficiently allocate resources to develop, produce and commercialize new products that respond to developing country opportunities and accelerating the pace of product availability.
3. **Supply chain capacity is increased so products can get to people who need them**. Enables health systems in developing countries to expand their capacity to deliver products to more patients, matched to the scale and mix of products required.
4. **Funders plan purchases and make the most of the money available.** Allows donors and national governments to efficiently allocate their resources by ensuring appropriate prices and adequate supplies of products.
5. **Public health community sees bottlenecks and opportunities to expand use**. Highlights key demand- and supply-side constraints, and can guide policy and advocacy efforts to reduce those constraints and achieve broader access.

Improved forecasting would benefit many stakeholders – so why hasn't this been fixed? Part of the explanation can be found in the fact that the major changes in funding, products and other factors are relatively recent, and there has not yet been a corresponding improvement in forecasting methods or institutional roles. However, that is only part of the explanation. The rest can be found in the fact that within the current market, risks are unequally distributed across key actors whose decisions affect supply of and demand for products. Manufacturers and patients who directly experience and suffer the consequences of the risks are not in a position to reduce them; the consequences are felt only indirectly by the funders and intermediaries who could take specific actions to reduce the underlying budgetary, policy-related, and logistics risks.

The result is that not all stakeholders face incentives that are aligned toward the aim of better forecasts and greater access to critical medical technologies. Moreover, because of the limited market potential in developing countries, the private sector invests little in market research and the development of other sources of information that are common in developed markets. Understanding and strategically correcting the misaligned incentives is a core challenge that currently is not being addressed. It constitutes a barrier to equitable and sustainable access to essential medicines.

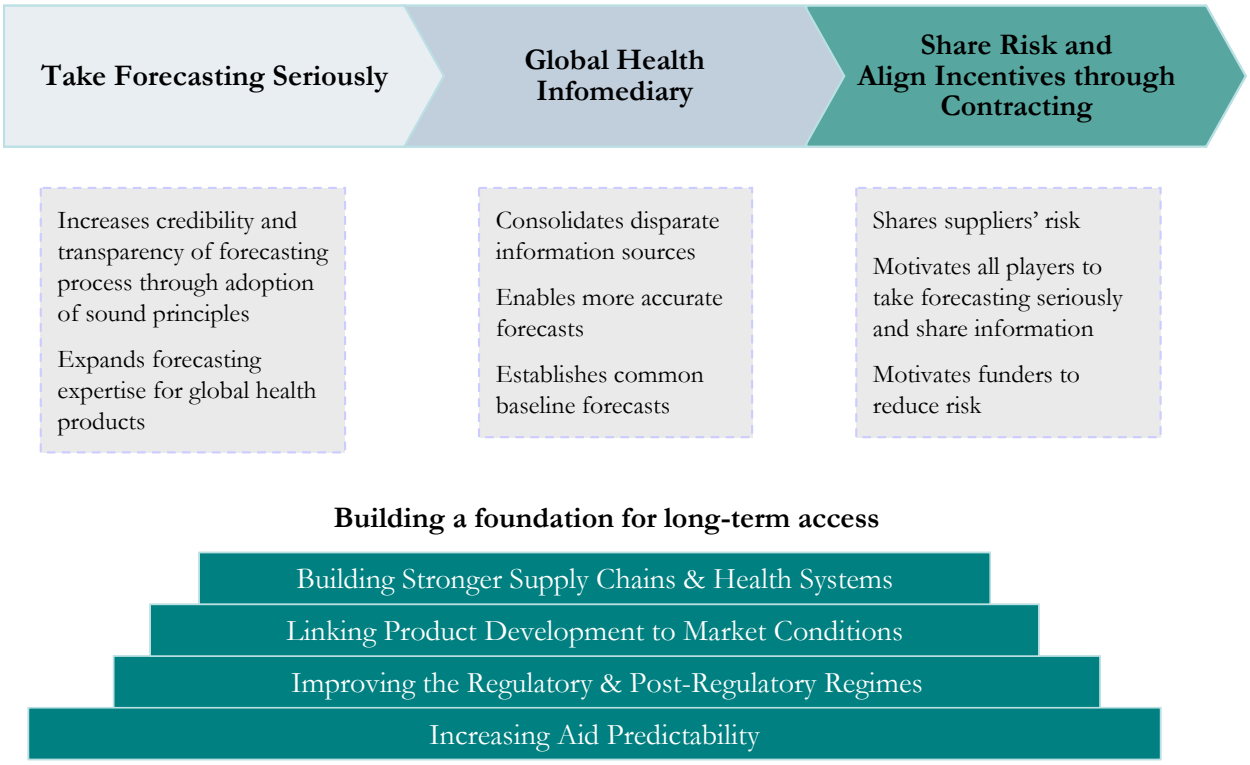
GLOBAL SOLUTIONS

Improvements in demand forecasting depend on progress toward better sharing risk and aligning incentives among those who influence market dynamics. This can be achieved by:

- Improving the capacity to develop credible forecasts by *taking forecasting seriously*;
- Mobilizing and sharing information in a coordinated way through the establishment of an *infomediary*; and
- *Sharing risks and aligning incentives through creative contractual arrangements.*

Implementing these recommendations would result in a major enhancement in the relationship among funders, suppliers, intermediaries and users of health products, and go a significant distance toward achieving the sort of alignment across participants in the global health value chain that is essential for long-term improvements in access to quality products. Far from being small technical "band-aids," these recommendations would contribute to making the new monies and new products realize their potential in better health outcomes in the developing world.

FIGURE 1: Recommendations at a Glance



Armed with better information from a credible infomediary and key principles of forecasting, funders should be able to comfortably assume a greater portion of the risk currently born by suppliers, which will allow for a greater return on their aid investment in the form of improved public health outcomes. Efficient contracting arrangements, in turn, will establish the incentives to improve the forecasting process itself, creating a virtuous cycle.

Taken together, these recommendations will dramatically improve aggregate demand forecasts for critical medical technologies at the global level. However, even with better forecasting capabilities there will remain a great deal of underlying uncertainty in these markets that requires a broader and longer-term agenda of strengthening health systems and building supply chain capacity in-country; increasing the market-orientation of product development activities; enhancing the regulatory regimes and enforcement for global health products; and improving the predictability of donor funding.

Taking Forecasting Seriously

Demand forecasting must become imbedded in all global efforts to increase access to essential medicines and technologies. This requires:

- A clear understanding of what is meant by "demand forecasting" and how it differs from needs forecasting, advocacy and demand creation activities.
- Universal adoption of basic principles for good forecasting to increase market understanding and credibility; better understand and mitigate system-wide risk; and increase value for money.
- Investing in technical forecasting capacity and creating models specific to forecasting for developing world health products.

Forecasting Principles

Agreeing on a common set of forecasting principles is particularly important to ensure that forecasting processes are credible and that all players will make decisions based on the forecasts produced which will maximize the proper matching of supply and demand. The Working Group recommends the adoption of 10 basic principles of forecasting:

Customer-Focused Principles identify how to ensure that forecasts will meet the needs of customers and have the greatest impact on the decisions they are intended to inform:

1. Identify the principal customers/decision makers of the forecast and clearly understand their needs.
2. Understand and clearly communicate the purpose of the forecast and the decisions that it will affect.
3. Create a forecasting process that is independent of planning and target setting.
4. Protect the forecasting process from political interference and ensure it is transparent.

Process- and Context-Focused Principles identify how to create a credible forecasting process and how to develop, present, and understand the forecast in relation to the overall market and public policy environment:

5. Embed the forecast into the broader environment taking into account market conditions, public policy, competitive forces, regulatory changes, health program guidelines, etc.
6. Create a dynamic forecasting process that continually incorporates and reflects changes in the market, public policy and health program capabilities.

Methodology- and Data-Focused Principles identify how to select the right methods for the nature of the forecast being developed and effectively incorporate qualitative and quantitative information:

7. Choose the methodologies most appropriate to the data and market environment. Obtain customers'/decision makers' agreement on the methodologies.
8. Keep the methodologies simple and appropriate to the situation. Don't introduce too much complexity, but include sufficient detail to address the level of investment risk and accuracy required.
9. Make forecast assumptions clear and explicit.
10. Understand data and their limitations. Use creativity and intelligence in gathering and introducing data into forecasts.

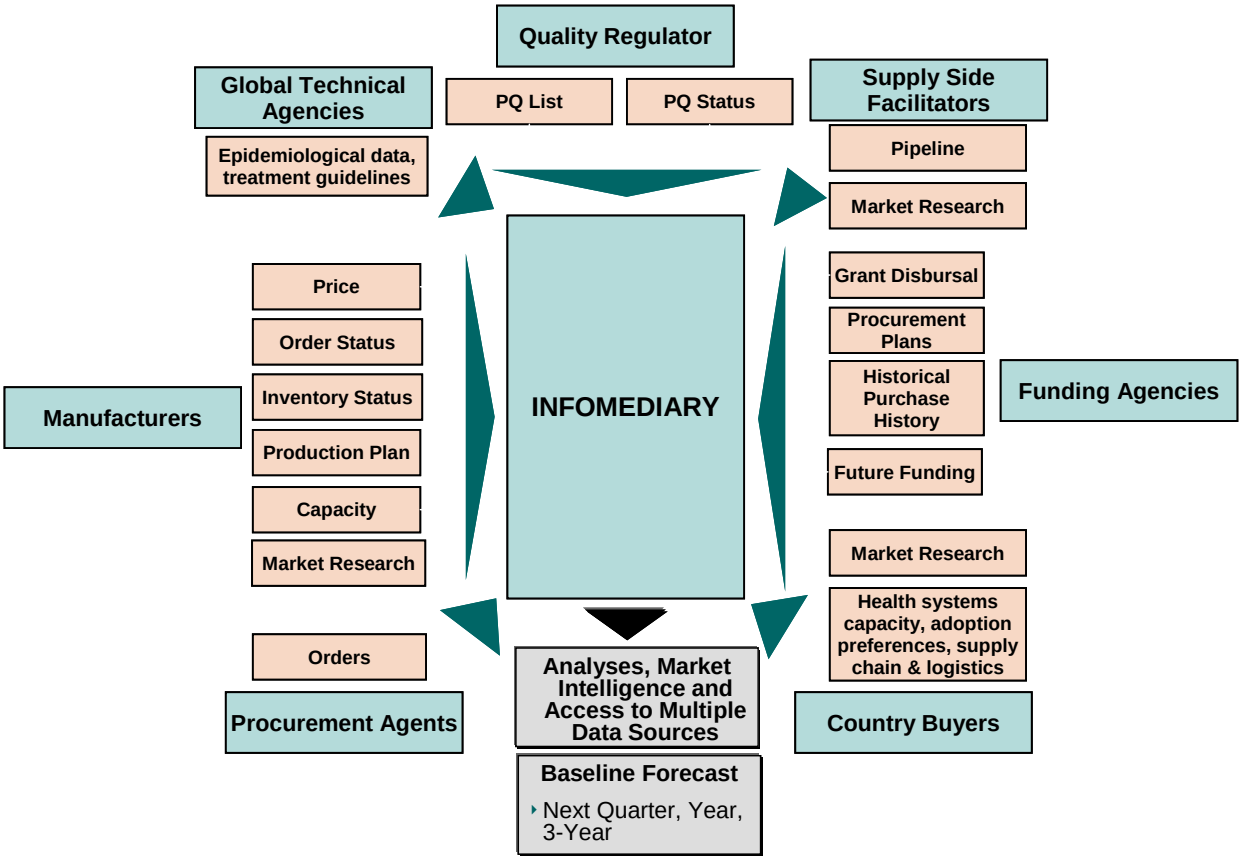
Create a Global Health Infomediary

Based on the current allocation of risk in the market for critical medical technologies, funding agencies, procurement agents, global health programs, and national buyers lack positive incentives to share information. These key stakeholders require similar types of basic information for forecasting across a variety of disease areas and geographies, with each having access to several important data elements but not systematically sharing it with others in the value chain. In addition to currently available data, investment in additional data gathering through focused market research is required to build accurate forecasts; several organizations are beginning to make this investment and models are being developed, but analyses and methodologies are not widely shared.

While all of these stakeholders would all like to have accurate forecasts, and do not have an obvious disincentive to share this information, few are willing to invest the resources for broad information gathering and sharing because they don't bear the financial risks for poor forecasting. On the other hand, suppliers directly bear a financial risk for bad forecasting, particularly for excess capacity, but they have a disincentive to share individually identified supply information that could make them vulnerable to competitors or to anti-trust allegations.

The resulting opacity of data increases both demand uncertainty and its associated risks. This suggests the need for an information intermediary, or ***infomediary,*** for global health to effectively gather and analyze data needed for demand forecasts across a variety of diseases and products and to make this information widely available to all stakeholders.

FIGURE 2: Recommendations at a Glance



The key functions of the infomediary would be to:

1. **Serve as central repository of all relevant demand and supply data** by collecting, synthesizing and disseminating information related to forecasting that individual organizations may not be willing or able to share independently.
2. **Ensure data integrity** and perform the labor-intensive tasks of cleaning and analyzing data received from multiple sources.
3. **Establish a mechanism for ongoing, continuous gathering** and updating of core forecasting information.
4. **Generate transparent, baseline aggregate forecasts** by product category based on the information sets provided, to serve as the common starting point for stakeholders to produce their own forecasts. Build aggregate and country level models for generating demand forecasts that consider the unique developing country environment.
5. **Incorporate information from specific market research studies** that are either conducted by the infomediary or other market research firms and stakeholders, to provide a more complete data repository and refine assumptions for forecasts.

6. **Serve as a neutral party** responsible only for information collection and generating baseline forecasts, and not involved in demand generation, advocacy, target setting or other functions that could compromise the integrity and independence of activities. Maintain strong relationships with public and private supply chain partners and establish credibility with stakeholders.

Sharing Risk and Aligning Incentives through Creative Contracting

An immediate opportunity exists to better align incentives and share risks through restructuring contractual arrangements. Effective contracting is also critical for ensuring that pooled purchasing mechanisms, which are being considered by many funders, achieve their objectives. However, global health funders in general have made only limited use of the wide range of risk-sharing arrangements.

BOX 1: Examples of Creative Contracting Arrangements

Minimum Purchase Commitments: Minimum purchase commitments require that a buyer agrees in advance to purchase a specified quantity of product, either in a single transaction or over a period of time. By accepting some of the supplier's risk for production, the buyer has an incentive to accurately forecast demand. Typically, suppliers offer incentives to buyers to take on this risk through reduced prices for the minimum purchase commitment. Suppliers are not committed to producing above the specified amounts, so this arrangement works best for the purchaser in cases where: the long term market demand is stable; there are substitutable products that prevent the risk associated with stock-outs; or there are opportunities to off-load excess inventory.

Quantity Flexibility Contracts: When there is high demand uncertainty, buyers may prefer committing to a lower level of demand while retaining the flexibility to purchase more product to guard against the consequences of stock-outs. Quantity flexibility contracts allow the buyer to commit to a minimum amount at a certain price, while at the same time binding the supplier to make a specified quantity of product above that amount available at a premium price if additional demand arises. Suppliers may be interested in these types of contracts if the marginal cost of production is low, but the base set up costs are high; if there are multiple suppliers; or if there is uncertainty about which supplier a purchaser will select. The contract may also allow suppliers to collaborate to buy and sell excess inventory, which limits each supplier's individual risk.

Buyback Contracts: Buyback contracts are useful in situations where demand is unstable but the risk of stock out is asymmetrically distributed among the stakeholders and has significant public health consequences. They are often used when the production cycle is long and it is difficult to scale up supply rapidly in cases of higher than expected demand or where the presence of supply can stimulate demand. For example, in the case of flu vaccines, it takes time to manufacture the vaccine and greater availability at the local level may stimulate demand for vaccinations, but small clinics may not be able to afford the costs of ordering more than a small amount. In this case, a supplier may encourage clinics to buy the vaccine with the assurance that the supplier will buy back some portion of the un-used vaccines at the end of the flu season.

Revenue Sharing: Like buyback contracts, revenue sharing is useful in situations where demand is uncertain but the presence of the product stimulates demand. This mechanism also encourages the sharing of demand and supply information between purchasers and suppliers. For example, having widespread and visible availability of bed nets can stimulate their use by customers. However, small local retailers may not have the cash flow to purchase a large number of bed nets unless they are assured they can quickly sell the nets. In this case, the supplier may make the bed nets available to local retailers at a very nominal price with the opportunity to share in the retailer's profits from bednet sales. Revenue sharing passes risk to the supplier, but also aligns supplier and retailer incentives and encourages suppliers to produce sufficient levels of supply. When this system works well, suppliers get timely information about actual sales since they share in the profits generated by those sales and can adjust production capacity accordingly.

Real Options: This contracting mechanism protects buyers against price uncertainty based on the principles of financial options markets, where a buyer can purchase the right to take some action at a future time for a pre-determined price (but is not obligated to do so). Acquiring an option typically requires some costs, and its outcome results in asymmetric returns. Real options involve the actual sale and purchase of goods if and when the option is exercised. An option is defined by the option price (upfront price paid to acquire the option), exercise price (price at which product can be purchased if the option is exercised) and an exercise date (typically a date range). A common form of real-options contracts described in supply chain management literature involves the buyer making firm commitments to the manufacturer for future year purchases (years 1, 2, 3) for a certain amount of product and purchasing an option to buy additional units at predetermined prices in years 2 and 3. Based on observed demand in the first year, the buyer decides whether or not to exercise the option in the second and third years. Real-option contracts can achieve results similar to the rolling horizon flexibility contracts that are recommended in the case of ACTs.

No single contracting option is optimal across all types of products and situations. Rather a range of approaches could and should be considered which shift the current risk allocation in which funders, procurement agents and national buyers accept little or no risk, while suppliers gear their decisions about pricing and investments in capacity to a market in which they face significant, unshared risk.

TOWARD IMPLEMENTATION

Achieving better demand forecasts for – and better access to – critical medical technologies in the developing world requires collaboration and investment from all of the key stakeholders in the value chain for these products, and will benefit each of them in turn. While the broader global health community plays a critical role in advocating for the importance of taking forecasting seriously, coordinating information and sharing risk, success ultimately depends on the actions of donors, industry and national health programs.

Donors & Funding Agencies: Donors and funding agencies like USAID and the Bill & Melinda Gates Foundation, as well as their beneficiaries such as the Global Fund and GAVI, are fundamentally in the business of saving lives and so place great value on using their aid dollars effectively. But only with better forecasting and efficient contracting will existing efforts to develop new products actually lead to a return on donors' aid investment in the form of improved public health outcomes.

In the realm of demand forecasting, donors now face innovative opportunities both to go further and to translate their work across product streams by committing start-up funding to a global health infomediary. These funds would go towards developing a repository structure to gather and house data; providing initial analyses and forecasts; populating the repository with available data and creating interfaces to update this data on an ongoing basis; and incorporating new data and market research studies into the repository as they are conducted.

Armed with better information from this infomediary, funders could go even further towards increasing access to critical medical technologies – and reducing their hidden costs – by assuming a greater share of the financial risk currently borne by suppliers through the adoption of efficient contracting mechanisms.

Suppliers: Suppliers of drugs, vaccines, diagnostics and other critical medical technologies value opportunities to serve as good global citizens by providing access to life-saving health interventions in developing countries, while also exploring new markets and protecting their corporate interests. Through collaboration with international donors and technical agencies, it would be possible to produce better demand forecasts that could reduce and share risk in these markets, which in turn could help craft better business cases for investing in developing country products and making them available for those who need them most.

Buying into the creation and widespread use of an infomediary that would generate better forecasts is both good for health and good for business. Specifically, individual suppliers could move towards better forecasts by providing public and proprietary data to a global health infomediary; in turn, they would be able to purchase information and baseline forecasts to inform their internal decisionmaking processes. Suppliers could also contribute by sharing its technical forecasting expertise with other global health stakeholders through forums, online tutorials, or other platforms.

National Health Programs: Developing country governments, and the ministries of health in particular, are charged with the essential task of delivering essential health products to as many of their citizens as possible within the context of constrained health system capacity and limited financial resources. Getting district- and country-level demand forecasts right is critical to both the availability and affordability of these products by eliminating shortages and wastage at the point of delivery as well as informing decisionmaking further upstream in the supply chain. To achieve this, national program managers must first and foremost take forecasting seriously by adopting principles of good demand forecasting, including increasing transparency of the demand forecasting process in countries and globally. Above all, the forecasting process must be independent, free from political interference, and separate from advocacy and target setting.

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