

**Information Sharing & Gathering as a Public Good**

By Daniella Ballou-Aares and Priya Mehta

**Abstract**

Good information plays a critical role in the development of accurate demand forecasts for essential drugs, vaccines, diagnostics and other health products for the developing world, and the rapidly growing and evolving global health marketplace has made collecting market information more complicated – and more important – than ever. Currently, however, the necessary data elements are either not available or not credible, with particularly severe gaps for seven high-priority information elements: 1) epidemiological, 2) national health-service coverage, 3) international donor funding, 4) historical consumption, 5) government willingness to pay, 6) international treatment guidelines/policies, and 7) supply-chain and logistics data.

A range of approaches is required to solve these information gaps, from information sharing alone to significant investments in gathering and analyzing “new” data. In the developed world, the market for information is highly evolved and depends mainly on independent private information providers that effectively serve the diverse needs of players across health product markets. In contrast, developing world information-sharing and gathering efforts typically exist within larger entities where demand forecasting is only a small part of the organization’s mandate and where competing priorities make it difficult to maintain a focus on the core developers of demand forecasts as their main customers.

Based on their findings, the authors recommend three complementary information-sharing initiatives to improve demand forecasting for global health products: 1) an online information collaborative; 2) an independent third-party information provider; and 3) a multi-stakeholder forum.

This paper informed the deliberations of the Center for Global Development’s Global Health Forecasting Working Group and is summarized in Appendix F of their final report, *A Risky Business: Saving Money and Improving Global Health through Better Demand Forecasts*.

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**Information Sharing & Gathering as a Public Good**  
**Recommendations to the Global Health Forecasting Working Group**

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October 2006 (revised May 2007)

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# INFORMATION SHARING & GATHERING AS A PUBLIC GOOD

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## EXECUTIVE SUMMARY

Good information plays a critical role in the development of accurate demand forecasts, not only in global health, but in any industry where projections of future product demand determine expectations for future investments in manufacturing capacity, sales and marketing efforts, or other such commercial investments. Access to more reliable and comprehensive data has the potential significantly to improve forecasting accuracy and to provide all stakeholders in a supply chain with a common understanding of market potential. Furthermore, the improved forecasts that result from better information reduce the likelihood of product shortages, delivery delays, or overproduction—all of which engender significant costs (financial and otherwise) to suppliers and end users. In global health, inaccurate demand forecasts cost lives.

Despite the criticality of good information to demand forecasting, those currently engaged in forecasting for health products in developing world markets frequently find that the data they need are either not available or not credible. Such information limitations clearly drive forecast inaccuracy. The global health community is increasingly recognizing the need for concerted action to address the challenges inherent in gathering and disseminating the information required to credibly forecast demand in developing world markets.

This paper aims to identify solutions that will address the most critical information challenges in forecasting demand for health products in the developing world. Specifically, it will:

1. Identify and prioritize the information requirements of core demand forecast developers
2. Identify gaps between the information required by these forecast developers and the information currently available to them, assess the main drivers of these information gaps, and consider approaches to address them
3. Determine the major barriers to closing critical information gaps through effective information sharing, and identify actions required to overcome them;
4. Develop concrete and feasible solutions to address meaningfully the critical information challenges faced by forecast developers in the developing world, and
5. Outline key implementation considerations that require further Working Group input.

This paper is the result of research and analysis conducted on behalf of the Global Health Forecasting Working Group and received significant input from Working Group members. The findings contained in this paper are largely derived from an in-depth assessment of the specific categories of information that forecast developers require effectively to forecast demand. This assessment, paired with a review of current models employed to share and gather such information in both developing and developed country contexts, has led to a set of three recommended solutions that have the potential to significantly improve the accessibility of accurate information to all stakeholders. A high-level summary of the key findings of each of these phases of analysis is below:

*Poor demand forecasts have a significant financial and operational impact on suppliers, product development partnerships (PDPs), and buyers—which together constitute the “core developers” of demand forecasts.*

- Core demand forecast developers rely on forecasts to effectively plan their operations, and they currently suffer significant shortfalls in their ability to access the information they require to effectively forecast demand in most developing world markets.
- Suppliers are particularly affected by information challenges, because demand forecasts are fundamental to all of their key business decisions – from capital investments to sales-force planning.
- PDPs rely heavily on demand forecasts to inform their strategic decisions, including advocating for funding, justifying R&D investment, developing product launch and distribution strategies, and engaging in education or capacity-building campaigns.
- Buyers do not depend on forecasts to the same extent as suppliers or PDPs, but are significantly impacted by the product stockouts and wastages that result respectively from the under- or overestimation of product demand. Such forecasting inaccuracy costs both lives and financial resources.

- Donors and international public health entities (e.g. WHO) also engage in forecasting initiatives and use forecasts to predict future funding requirements, but do not depend on forecast accuracy to the same degree as suppliers, PDPs, and buyers. Thus, while the relevance of these organizations to demand forecasting is apparent, we do not classify them as “core forecast developers.”

*The rapidly growing and evolving markets for health products targeting the developing world have made collecting market information more complicated – and more important – than ever.*

- New buyers, suppliers, and funders act independently and use unique systems to collect data.
- New players lack the longstanding networks and systems for information sharing that exist among organizations that have been in these markets for longer periods of time (such as condom manufacturers).
- Significantly more dynamic, robust, and transparent systems for information sharing and gathering are needed in this new environment.

*A review of the current state of information sharing and gathering demonstrates that suppliers, PDPs, and buyers often have similar information needs and are limited by similar information gaps.*

- For simplicity, the vast array of potential data inputs into demand forecasts have been classified and broadly grouped into 4 types of information classified broadly grouped: 1) *international data*, 2) *national data*, 3) *disease/product data*, and 4) *target population/behavioral data*
- Potential data inputs to demand forecasts can in turn be divided into 17 distinct categories of information, ranging from epidemiological and demographic trends to historical and expected funding and product consumption – and extending even to information describing patient behavior
- Significant commonalities exist in the types of information that forecast developers need and in the gaps identified in the availability and quality of that information.
- Across all players, forecast developers place a high priority on the following seven categories of data, and all face severe gaps in its availability and quality: **particularly severe gaps in information availability and quality exist within 7 critical information categories:** 1) *epidemiological*, 2) *national health-service coverage*, 3) *international donor funding*, 4) *historical consumption*, 5) *government willingness to pay*, 6) *international treatment guidelines/policies*, and 7) *supply-chain and logistics data*.

*A range of approaches is required to solve information gaps, from information sharing alone to significant investments in gathering and analyzing data.*

- For some categories, the information required is already captured and tracked, but is not shared effectively among the various groups of core forecast developers. This is the case with *international donor funding* and *international treatment guidelines/policies* data, for which many of the relevant information gaps could be addressed by basic improvements in formatting, consolidating, and sharing of donor data.
- In most priority information categories, however, not only are significant improvements required in sharing the existing data, but additional investments are ultimately needed to comprehensively capture primary data. This is the case with *historical consumption*; *epidemiological*; *national health-service coverage* and *supply chain/logistics* data.
- Finally, in the area of *government willingness to pay*, little relevant data exists to share among forecast developers. Here, immediate investments in gathering and compiling primary data are necessary.

*In the developed world, the market for information is highly evolved and depends mainly on independent private information providers that effectively serve the diverse needs of players across health product markets. In contrast, developing world information-sharing and gathering efforts typically exist within larger entities where demand forecasting is only a small part of the organization’s mandate and where competing priorities make it difficult to maintain a focus on the core developers of demand forecasts as their main customers.*

- In the developed world, numerous independent private firms exist primarily to provide reliable forecast information, from standard primary market and consumption data to customized research tailored to distinct products or geographic regions. Such organizations build and maintain

credibility by remaining focused on meeting customer needs and by making investments to build the extensive information-collection networks required to do so effectively.

- Developing world initiatives, by contrast, are typically disease-specific, housed within larger entities (or are a consortium of multiple entities), and seldom concerned exclusively with forecast requirements.
- In both developing and developed world markets, public health entities provide some key data, but the credibility and scope of the data are often significantly lower for developing countries.

Based on these key findings, several recommendations for potential information sharing solutions have been put forth:

*To solve these pressing challenges to effective information sharing and gathering in the developing world, three main initiatives could be undertaken, likely in conjunction, to address the full range of data needs identified by forecast developers:*

- *Online Information Collaborative – GlobalHealthForecastingInfo.org:* This online information sharing collaborative would compile a broad range of data 'descriptors' via a user-friendly website. The website would serve as a data repository, providing descriptions of data availability, quality, location, and application for the categories of information most frequently used in forecasting demand. This information would be initially input by the website host, but would evolve over time according to the participation of website users. Such a mechanism would be low cost and dynamic, and its success largely dependent on the level of user engagement.
- *Independent Third-Party Information Provider – The Global Health Information Service:* An independent third-party information provider (or providers) would serve as a credible and widely recognized focal point responsible for the gathering of information required to forecast credibly the demand for health products in the developing world. The service would collect, validate, synthesize, and analyze these data, providing clear, comprehensible information to forecast developers. Such a service would require the collection of existing information from numerous players as well as the creation of mechanisms to better capture primary data. The service could build on the extensive data collection and dissemination capabilities already available among the many information providers currently focused on serving the private sector in the developed world. The likely cost of these services would vary widely based on the scope of the information sought and on the resources required to support the cost of staff to manage and maintain the information networks.
- *Multi-Stakeholder Forum – The Global Health Demand Forecasting Information Forum:* This multi-stakeholder, information-sharing forum would rely on participation from key stakeholders via email, conference calls and conferences. This forum would require a significant investment of time and expense by participant organizations and thus would be used for a very limited set of priority data requirements with highly complex information-sharing challenges, in particular those that require joint problem solving, system integration, or new organizational processes to solve.

*Questions for Decision Makers:*

This paper concludes by proposing three potential solutions that could, solely or in conjunction, address the severe information challenges faced by core forecast developers in global health. To move from recommendations to the implementation of tangible solutions, however, the Working Group must first collectively answer the following questions:

- How does the Working Group rate the feasibility (political, institutional, and technical) of each solution? What conditions are required for successful execution, and what barriers must be overcome?
- Of the three information-sharing solutions identified, which solution or combination of solutions does the Working Group believe best address the information challenges identified? If multiple solutions were endorsed, what would be the preferred order of implementation, and what degree of coordination would be required?
- Which initiatives or organizations are best positioned, and most willing, to lead the agreed effort(s)? What is required from the lead player and from other stakeholders to make the initiative(s) selected a success?

- What management, incentive, and governance structures are most appropriate for the preferred solution(s)? If multiple solutions are endorsed, should a single organization or body oversee or manage initiatives, or should they be managed separately?
- What business models should be considered for the selected solution, given initial funding needs and goals of longer-term sustainability?

## 1. INFORMATION NEEDS ASSESSMENT: Who develops forecasts, what are their needs, and what are the most significant information gaps?

This overview of demand forecasting information requirements aims to answer the following questions: Who are the core demand forecast developers, and what types of forecasts does each employ? What are the roles of the various forecasts in the decision-making processes of each player? What are the information needs, priorities, and gaps in demand forecasting for developing world products across players and forecast types?

### 1.1. Core Forecast Developers, Forecast Types, and the Role of Forecasts

The core developers of demand forecasts are **suppliers, product development partnerships (PDPs), and buyers**. All three of these stakeholders in the global health supply chain employ a range of demand forecasts with varying time horizons to inform their critical business decisions. These forecasts have been categorized into three types that will be analyzed going forward. These are 1) long-term strategic global demand forecasts, 2) medium-term demand forecasts, and 3) short-term sales/procurement forecasts.

To identify “core forecast developers” and the forecast types used by each, the forecasting process was mapped from the perspective of each relevant organization and implications drawn across a variety of perspectives, products, and disease areas (a list of interviews conducted can be found in *Annex 2*). The table below shows a summary of the core developers of forecasts:

**Exhibit 1:** (Source: Working Group and Expert Interviews)

Core demand forecasting developers	Examples	Forecast type used	Role in demand forecasting	Criticality to decision-making
<b>Suppliers/ PDPs</b>	<ul style="list-style-type: none"> <li>•Branded pharma</li> <li>•Generic pharma</li> <li>•Biotech companies</li> <li>•PDPs</li> </ul>	<ul style="list-style-type: none"> <li>•<b>Strategic demand</b> (Medium to Long-term)</li> <li>•<b>Sales</b> (Short-term)</li> </ul>	<i>Primarily Developer</i> <ul style="list-style-type: none"> <li>•Product portfolio/capacity influences product selection</li> <li>•Uses forecasts to plan sales/ marketing, production/ manufacturing capacity</li> </ul>	 (Very High)
<b>Buyers: Program Implementers</b>	<ul style="list-style-type: none"> <li>•National Ministries of Health</li> <li>•NGO program implementors</li> <li>•Private-sector distributors</li> </ul>	<ul style="list-style-type: none"> <li>•<b>Strategic demand</b> (Medium-term)</li> <li>•<b>Procurement</b> (Short-term)</li> </ul>	<i>Influencer and Developer</i> <ul style="list-style-type: none"> <li>•Makes purchase decision</li> <li>•Invests/plans own supply chain capacity</li> </ul>	 (Medium)
<b>Buyers: Purchasing Intermediaries</b>	<ul style="list-style-type: none"> <li>•UNICEF, WHO, INFPA, IAPSO</li> <li>•USAID, GTZ</li> <li>•Crown Agents</li> <li>•IPPF</li> <li>•IDA, Mission Pharma, other..</li> </ul>	<ul style="list-style-type: none"> <li>•<b>Strategic demand</b> (Medium-term)</li> <li>•<b>Procurement</b> (Short-term)</li> </ul>	<i>Primarily Developer</i> <ul style="list-style-type: none"> <li>•Makes purchases based on demand information provided by buyers (donors or national program implementers)</li> </ul>	 (High)
Funders	<ul style="list-style-type: none"> <li>•GAVI</li> <li>•Global Fund</li> <li>•US Govt (PEPFAR/USAID)</li> <li>•Gates</li> </ul>	<ul style="list-style-type: none"> <li>•Strategic demand (Long-term)</li> </ul>	<i>Primarily Influencer</i> <ul style="list-style-type: none"> <li>•Provide resources that can be realized as product demand</li> <li>•Adjust future resource based on existing demand fulfilled</li> </ul>	 (Low)

**SUPPLIERS:** The mapping of the demand forecasting process from the various perspectives confirmed that suppliers are both the key developers and customers of demand forecasts. Suppliers include both branded and generic pharmaceutical companies and biotechnical companies. Throughout the product-development lifecycle, they use three key types of demand forecasts that influence a variety of critical product-investment decisions. These forecast types and the investment decisions influenced by each are listed below:

FORECAST TYPE	TIME HORIZON	INVESTMENT DECISIONS INFLUENCED
Strategic Global Demand	Long-term <ul style="list-style-type: none"> <li>▪ 5-25 years</li> <li>▪ Pre-launch</li> </ul>	R&D Investment
Strategic Demand	Medium-term <ul style="list-style-type: none"> <li>▪ 2-5 years</li> <li>▪ Pre- and Post-launch</li> </ul>	Manufacturing/Distribution Capacity
Sales	Short-term <ul style="list-style-type: none"> <li>▪ 12-18 months</li> <li>▪ Pre- and Post-launch</li> </ul>	Sales/Marketing Resources

**PRODUCT DEVELOPMENT PARTNERSHIPS (PDPs):** PDPs are entities that aim to bring philanthropic resources and private-sector expertise together to encourage new product development. PDPs are also core forecast developers and customers, using the same three key forecast types as suppliers to inform their particular investment decisions. PDPs use demand forecasts primarily to encourage R&D investment and advocate for funding, but PDPs that manufacture their own products will accordingly act as suppliers and continue forecasting after a product is launched:

FORECAST TYPE	TIME HORIZON	INVESTMENT DECISIONS INFLUENCED
Strategic Global Demand	Long-term <ul style="list-style-type: none"> <li>▪ 5-25 years</li> <li>▪ Pre-launch</li> </ul>	Justify R&D investments to pharma and biotech companies; Advocate for funding from philanthropic and public-sector donors;
Strategic Demand	Medium-term <ul style="list-style-type: none"> <li>▪ 2-5 years</li> <li>▪ Pre- and Post-launch</li> </ul>	Develop product launch strategies; Identify priorities for policy development and advocacy; <i>Determine necessary manufacturing and distribution capacity (own products)</i>
Sales	Short-term <ul style="list-style-type: none"> <li>▪ 12-18 months</li> <li>▪ Pre- and Post-launch</li> </ul>	Education and capacity building resource investments

**BUYERS:** In addition to suppliers and PDPs, buyers—a term used to refer both to international procurement agents serving as purchasing intermediaries and to program implementers such as Ministries of Health, NGOs, and private-sector distributors managing in-country supply chains—also rely on forecasts to inform key purchasing decisions. Buyers, unlike suppliers or PDPs, typically initiate forecasts only after the product is available, as they are not involved in the product-development process. However, recent trends including aggregate purchasing and longer-term market developments such as Advanced Market Commitments (AMCs) mean that buyers are increasingly involved in the earlier, pre-launch stages of strategic demand forecasting. Furthermore, buyers can be significantly affected by product stockouts or product expiry and wastage that are caused by inaccurate demand forecasts and that cost both lives and valuable resources. Still, the effects of inaccurate forecasts on buyers are not as significant as they are for suppliers, who must (as noted) rely on available forecasts to plan every aspect of their businesses.

FORECAST TYPE	TIME HORIZON	INVESTMENT DECISIONS INFLUENCED
Strategic Demand	Medium-term <ul style="list-style-type: none"> <li>▪ 2-5 years</li> <li>▪ Post-launch</li> </ul>	Determine funding requirements; Understand likely product mix; Plan supply chain capacity investments
Procurement	Short-term <ul style="list-style-type: none"> <li>▪ 12-18 months</li> <li>▪ Post-launch</li> </ul>	Determine purchase quantities by product; Create purchase timing & distribution schedule; Estimate product & supply-chain expenses

## 1.2. Changing landscape of forecast developers

As discussed in the Working Group Background Paper, the quantity and scale of involvement in major developing country product markets is rapidly increasing. In the past five years, donor funds alone have dramatically increased, so much so that today's largest funder of AIDS, TB and malaria programs (the Global Fund to Fight AIDS, TB and Malaria) is only four years old. Another example is the emergence of product development partnerships (PDPs), a recent phenomenon currently recognized as a crucial source of R&D funding, supporting new product development to address the needs of the developing world. That suppliers have noted these significant investments in developing markets is seen in their pursuit of PDP partnerships to collaboratively fund R&D in these markets. Suppliers are increasingly entering these markets that were previously disregarded and are often doing so even without the benefit of an established distribution network in the developing world.

Such developments illustrate that there are new players interacting at all levels, having unknown impact on the markets or unknowingly trying to participate in them. The existence of simple, dynamic and transparent information sources is therefore more critical than ever. This new market cannot, for instance, depend solely on existing relationships for information sharing. Instead, it must create ways for each group to access to the information they need, enabling as many players as possible to participate in the market.

## 1.3. Identifying information requirements and priorities across players and forecast types

A detailed mapping of forecast processes and numerous in-depth discussions with core forecast developers identified 17 "information categories" that together comprise the most critical and frequently employed inputs to forecasting demand for health products in developing world markets. These categories have been carefully refined and are broadly endorsed by Working Group members as both accurate and comprehensive. Further, initial findings around information requirements were validated via an "Information Needs, Gaps, and Sources" survey distributed to various stakeholders regularly engaged in the forecasting process.

At the highest-level, the countless potential data inputs utilized by suppliers, PDPs and buyers in demand forecasting can be broadly grouped and classified as follows: 1) international data, 2) national data, 3) disease/product data, or 4) target population/behavioral data. In turn, 17 information categories used most frequently by forecast developers were then identified and classified accordingly.

Each of these categories is described in the tables below:

### INTERNATIONAL DATA

	Information Category	Description
1	<b>International Treatment Guidelines and Policies</b>	Information on global regulatory processes and treatment guidelines, including: <ul style="list-style-type: none"> <li>• WHO pre-approval process</li> <li>• WHO Treatment Guidelines</li> <li>• WHO Essential Drugs List</li> <li>• Other global processes/guidelines</li> </ul>
2	<b>International Donor Funding and Program Data</b>	Information on donor-generated resources, including: <ul style="list-style-type: none"> <li>• Historical international donor funding by product, country, and program</li> <li>• International donor funding targets and projected funding by product, country, and program</li> <li>• Anticipated timing of funding availability</li> <li>• Other funding constraints</li> </ul>

### NATIONAL DATA

	Information Category	Description
3	<b>National Macro-economic and</b>	Information on country wealth, growth and socio-political factors, including: <ul style="list-style-type: none"> <li>• GDP growth rates</li> </ul>

	<b>Sociopolitical Data</b>	<ul style="list-style-type: none"> <li>• GDP per capita</li> <li>• Sociopolitical indicators (e.g. political stability, government effectiveness, regulatory quality, rule of law, control of corruption, and accountability)</li> </ul>
4	<b>National Health Service Coverage Data<sup>1</sup></b>	<p>Indicators of historical/present health care coverage of target population, including:</p> <ul style="list-style-type: none"> <li>• Rate of immunization</li> <li>• Rate of detection/diagnosis</li> <li>• Percentage receiving treatment</li> <li>• Contraceptive prevalence</li> </ul>
5	<b>National Health System and Accounts Data<sup>2</sup></b>	<p>Indicators of the strength and capacity of the health care system (personnel and facilities), including:</p> <ul style="list-style-type: none"> <li>• Public expenditures on health (including historical and projected national government spending on health care, specific programs (e.g. immunization) or specific products)</li> <li>• Private expenditures on health care (out-of-pocket expenditures, prepaid plans)</li> <li>• Physician/nurse/midwife/dentist/pharmacist/health-worker density</li> <li>• Hospital/hospital bed/pharmacy/laboratory/clinic density</li> <li>• Number of medical/nursing schools</li> <li>• Indicators on responsiveness of health system</li> </ul>
6	<b>National and NGO Program Targets</b>	<p>Information on the size, scope, and impact of country programs, including:</p> <ul style="list-style-type: none"> <li>• Patient targets of in-country programs</li> <li>• Service statistics on in-country programs</li> <li>• Plans for expansion of in-country programs</li> </ul>
7	<b>Government Willingness to Pay and Likelihood of Adoption</b>	<p>Indicators of government willingness to invest in and adopt a product, including:</p> <ul style="list-style-type: none"> <li>• Market research on country willingness to make investments in product vs. other potential investments</li> <li>• Proxies for likelihood to adopt, including: <ul style="list-style-type: none"> <li>– History of clinical trials</li> <li>– Adoption of other new technologies</li> </ul> </li> <li>• Historical data on delays of adoption (e.g. post-licensure lag)</li> </ul>
8	<b>National and NGO Guidelines and Policies</b>	<p>Information on national regulatory policies and treatment guidelines, including:</p> <ul style="list-style-type: none"> <li>• National regulatory processes</li> <li>• National treatment guidelines (e.g. national health policy, national drug policy)</li> <li>• National trade and export/import regulations (e.g. minimum shelf-life requirements)</li> <li>• Program treatment selection processes/guidelines</li> <li>• Program implementation protocols and monitoring of compliance</li> </ul>
9	<b>Supply Chain and Logistics Data</b>	<p>Information on the forecasting process, supply status, and delivery times for particular product types, including:</p> <ul style="list-style-type: none"> <li>• Mappings of forecasting processes</li> <li>• Times/locations of product receipts</li> <li>• Historical/current product inventory levels and locations</li> <li>• Lead times</li> <li>• Mappings of procurement and distribution systems</li> </ul>

<sup>1</sup> *Measuring Commitment to Health*, Final Report of the Center for Global Development Global Health Indicators Working Group, September 2006.

<sup>2</sup> *Measuring Commitment to Health*, Final Report of the Center for Global Development Global Health Indicators Working Group, September 2006.

**DISEASE/PRODUCT DATA**

	<b>Information Category</b>	<b>Description</b>
10	<b>Product Profile Data</b>	Information on key characteristics of existing or future products (as relevant and available), including: <ul style="list-style-type: none"> <li>• Product formulation/specifications (e.g. efficacy, duration, dosing schedule, shelf life, storage and handling requirements)</li> <li>• Likely target population (e.g. child, adolescent, adult, or other)</li> <li>• Regulatory status</li> <li>• Product price</li> <li>• Delivery and operations costs</li> </ul>
11	<b>Historical Consumption Data</b>	Historical market sales data, including: <ul style="list-style-type: none"> <li>• Historical product sales (for existing products), segmented by product and by country</li> <li>• Historical product sales for analog products (as a proxy for products that have not been launched), segmented by product and by country</li> </ul>
12	<b>Market Trend Analysis</b>	Market analysis on product trends, including: <ul style="list-style-type: none"> <li>• Market growth</li> <li>• Market share</li> <li>• Anticipated introduction of competitor/substitute product(s)</li> <li>• Analysis of public vs. private markets</li> </ul>
13	<b>Country-Level Procurement Plans</b>	Country/program level plans for product procurement, including: <ul style="list-style-type: none"> <li>• Specific procurement plans describing anticipated quantity and timing of product procurement</li> <li>• Historical and outstanding tenders issued by buyers for purchase of specific products</li> </ul>

**POPULATION/BEHAVIORAL DATA**

	<b>Information Category</b>	<b>Description</b>
14	<b>Demographic Data</b>	Demographic data by country, including population characteristics such as: <ul style="list-style-type: none"> <li>• Age</li> <li>• Sex</li> <li>• Race/Ethnicity</li> <li>• Income/Socioeconomic status</li> <li>• Fertility rates</li> <li>• Birth rates</li> <li>• Life expectancies</li> <li>• Height and weight</li> <li>• Mortality rates</li> </ul>
15	<b>Epidemiological Data</b>	Disease-specific epidemiological data by country and target population(s), including estimates and projections of: <ul style="list-style-type: none"> <li>• Incidence</li> <li>• Prevalence</li> <li>• Mortality</li> <li>• Morbidity</li> </ul>
16	<b>Consumer Behavioral Data</b>	Information to understand consumer product preferences, cultural norms, and acceptable locations and providers, including: <ul style="list-style-type: none"> <li>• Household surveys</li> <li>• Attitudinal surveys</li> <li>• Social anthropological studies</li> <li>• Compliance with existing vaccines/drugs</li> <li>• Market research on consumer willingness to pay</li> </ul>

		<ul style="list-style-type: none"> <li>• Level of education</li> </ul>
17	<b>Physician Behavioral Data</b>	Information to understand physician product preferences, including: <ul style="list-style-type: none"> <li>• Physician willingness to prescribe/physician prescribing data</li> <li>• Physician knowledge level</li> </ul>

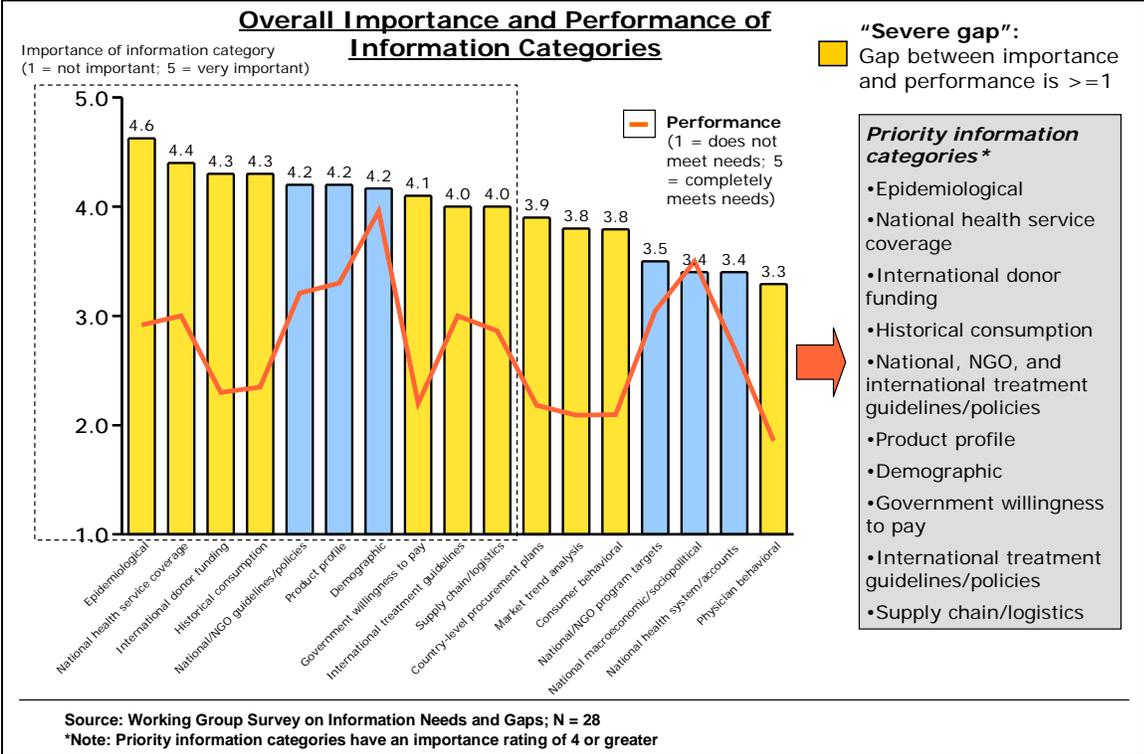
The consistency of the “information wish list” provided by forecast developers, even across organizations, products, and disease areas, is a significant finding in itself. Furthermore, all players identified significant and highly consistent gaps in the availability and reliability of the bulk of information currently available for use in forecasting.

While most respondents reported using most or all of these 17 information categories, 10 were highlighted as being of particular importance to forecast development. These are:

- Epidemiological data
- National health-service coverage data
- International donor funding data
- Historical consumption data
- National/NGO treatment guidelines/policies
- Product profile data
- Demographic data
- Government willingness to pay/likelihood of adoption data
- International treatment guidelines/policies
- Supply chain/logistics data

Even more telling is that gaps identified in information quality and availability exist within most of the information categories, but are *most* severe in high-priority information categories. As highlighted in the chart below, **particularly severe gaps in information availability and quality exist within 7 critical information categories:** *epidemiological, national health-service coverage, international donor funding, historical consumption, government willingness to pay, international treatment guidelines/policies, and supply-chain and logistics data.*

**Exhibit 2:** (Source: Working Group Information Needs, Gaps, and Sources Survey, N=28)



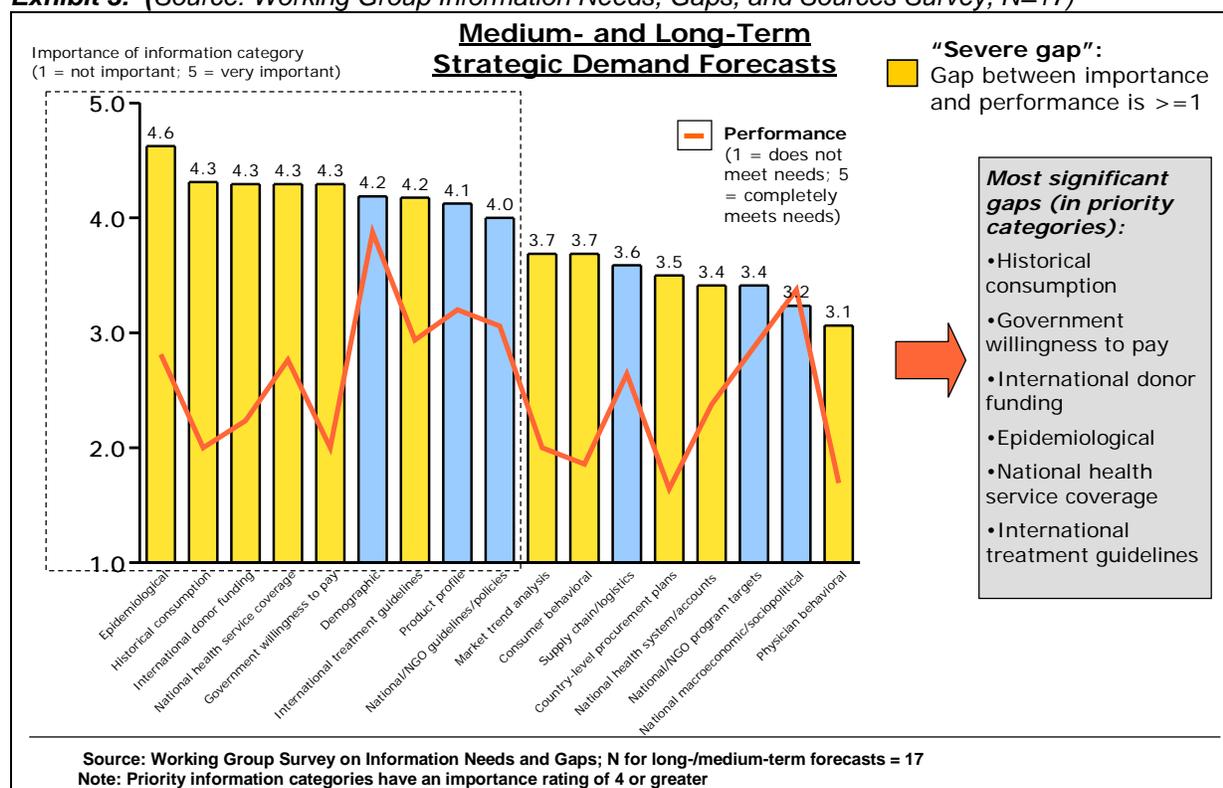
The focus of the following analysis presented in this paper is to convey an in-depth understanding of the key drivers of information priorities and critical gaps, and to clearly propose three potential information-sharing and gathering solutions that have the potential to greatly improve the ability of all forecast developers accurately to predict future demand.

### 1.4. Identifying information requirements and priorities by player and forecast type

To generate information solutions that will be both powerful *and* ultimately feasible for all stakeholders, we must first acknowledge that, despite the remarkable consistency in identified information priorities and gaps across organizations, forecast types, products, and diseases, there are subtle but crucial differences. Analysis of these differences was accomplished by segmenting the results of the “Information Needs, Sources and Gaps Survey” across various dimensions. **The survey results indicate that the primary driver of differences in information needs is forecast type, rather than by forecast developer** specifically between the information requirements of 1) medium- and long-term strategic demand forecasts and those of 2) short-term sales/procurement forecasts.

For medium- to long-term strategic-demand forecasts, the information requirements are necessarily those that indicate the long-term evolution of the disease and target population, combined with those that lend an understanding of international and country-level limitations on product demand and distribution. Thus, as shown below, *epidemiological* and *demographic* data are key to developing medium- and long-term demand forecasts, as are *historical consumption*, *international donor funding*, *national health service coverage*, *country willingness to pay*, *international* and *national/NGO treatment guidelines and policies*, and *product profile* data. For forecasts with longer time horizons, severe gaps exist in the availability and quality of all of these priority information categories, with the exception of *demographic*, *product profile*, and *national/NGO treatment guidelines* data.

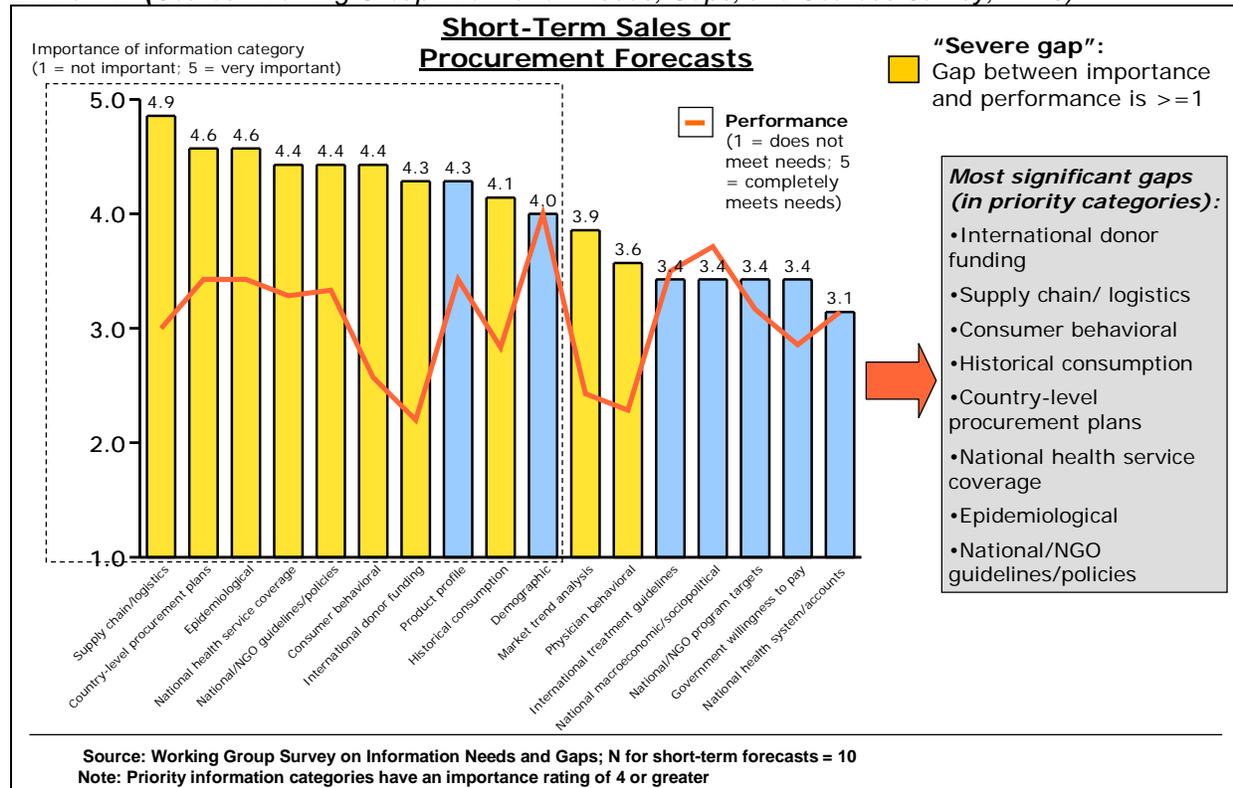
**Exhibit 3:** (Source: Working Group Information Needs, Gaps, and Sources Survey, N=17)



By contrast, short-term sales and procurement forecast developers prioritize data that more directly inform immediate purchase decisions, and that are accordingly of a much more granular nature. While

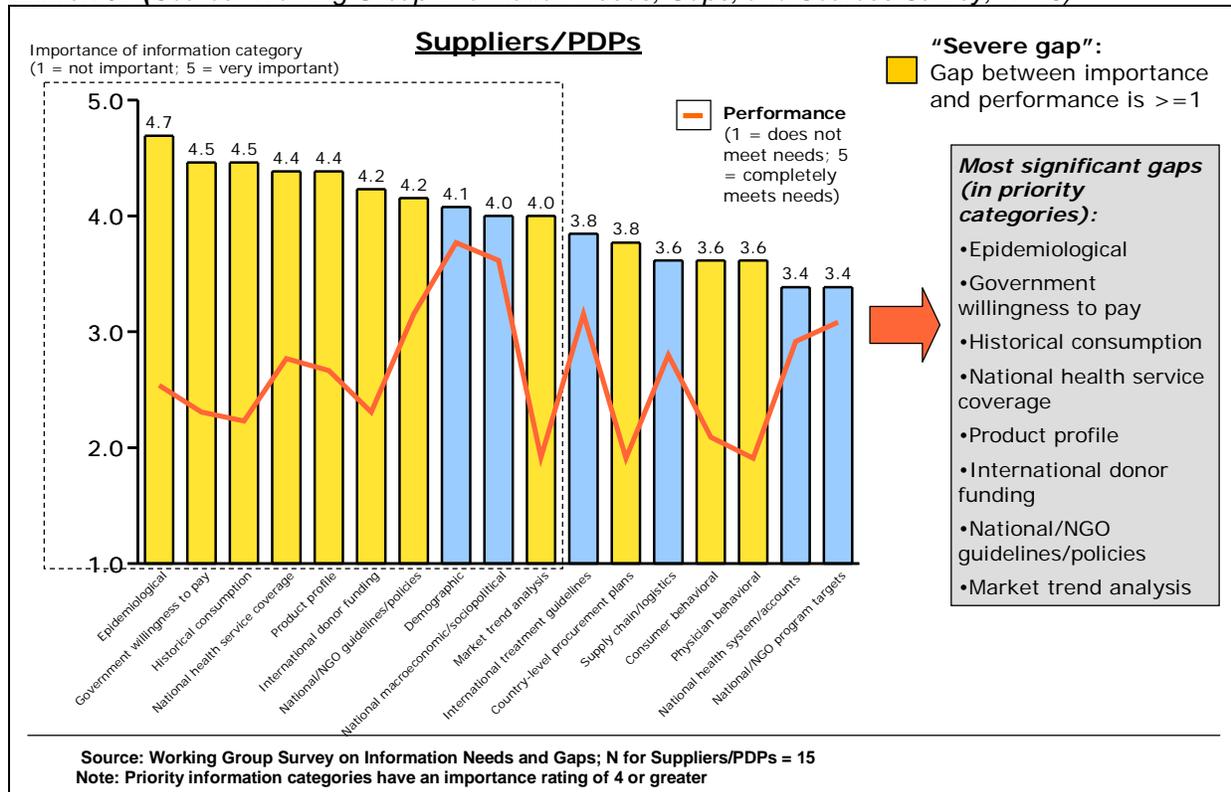
epidemiological data, national health service coverage data, international donor funding data, product profile data, historical consumption data, and demographic data are still of importance, short-term forecasts additionally require good information about in-country *supply chain and logistics*, *country-level procurement plans*, and prioritize *national/NGO guidelines and policies* over international guidelines. Particular gaps were identified across all of these priority categories, again with the exception of *product profile* and *demographic* data, as shown below:

**Exhibit 4:** (Source: Working Group Information Needs, Gaps, and Sources Survey, N=10)

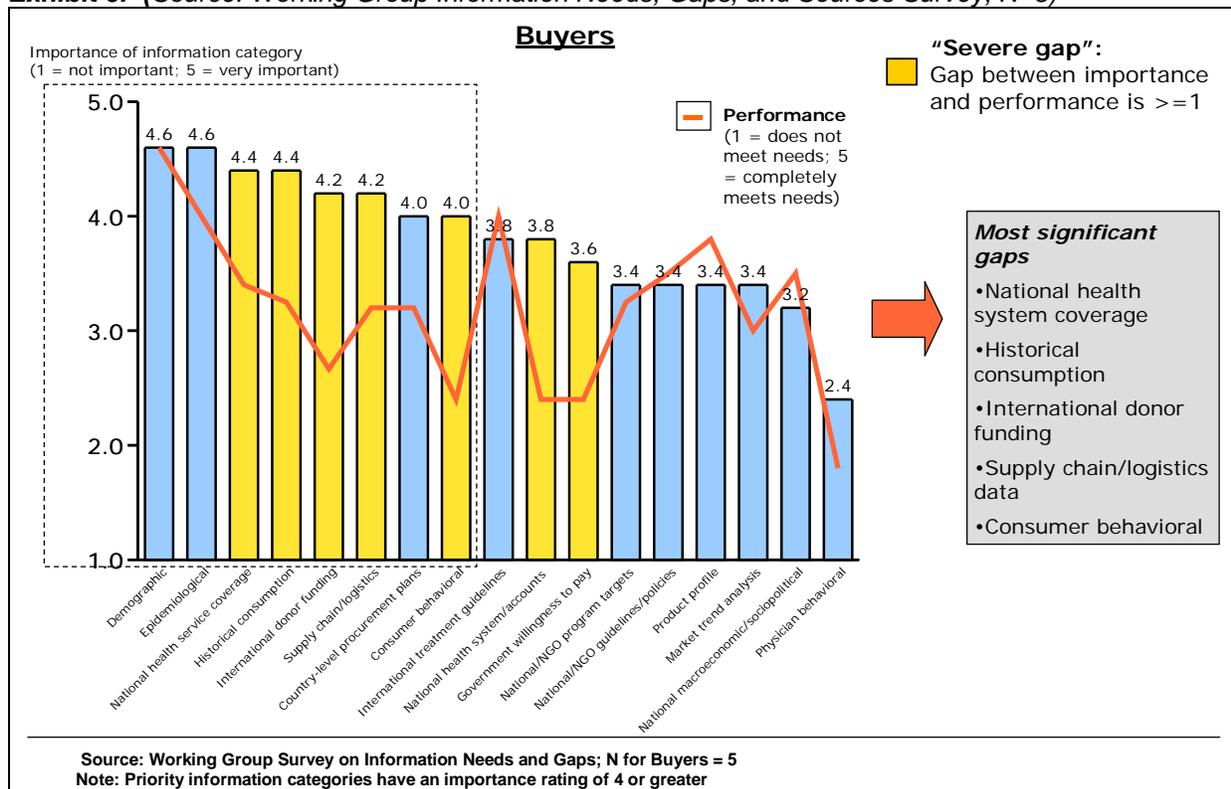


Information categories differ not only across the forecast time horizon, but also across the type of forecast developer. Suppliers, PDPs, and buyers each prioritize information categories slightly differently and identify particular gaps in different areas. For suppliers, significant gaps exist in *historical consumption* data, *government willingness to pay*, *epidemiological* data, *international donor funding* data, *product profile* data, *national health service coverage* data, *national/NGO guideline and policy* data, and *market trend analysis*. Buyers also value *epidemiological* and *demographic* data, and prioritize gaps in *historical consumption* data, *international donor funding* data, and *national health system coverage* data, but unlike suppliers prioritize *country-level procurement plans* and gaps in *supply chain and logistics* data and *consumer behavioral* data over insights into *government willingness to pay*, *market trend analysis* or *national/NGO guidelines/policies*. Also, unlike suppliers/PDPs, buyers also feel that available *epidemiological* data largely meet their needs. These differences are illustrated in the two charts below:

**Exhibit 5: (Source: Working Group Information Needs, Gaps, and Sources Survey, N=15)**



**Exhibit 6: (Source: Working Group Information Needs, Gaps, and Sources Survey, N=5)**



**1.5. Identifying sources, users, and specific gaps for priority information categories:**

Why do those forecasting demand face such severe challenges with regard to the seven types of information listed above? Several factors about the way information is currently shared are important drivers: 1) information is often shared in only an ad-hoc manner, 2) there is a tendency to treat information as proprietary by default, and 3) there is very little of the data standardization required to share data systematically and across multiple stakeholders.

The table in *Annex 3* provides an overview of the key sources and users of each priority information category, and offers some detail around the critical information gaps, as described by forecast developers, in the data currently available to them. The table additionally lists preliminary considerations of the specific actions required to address the issues associated with each information category, and the broader implications of these required actions for the ultimate solution recommendations. *Annex 3* also contains short profiles of each of these information categories, including survey rating data and key findings.

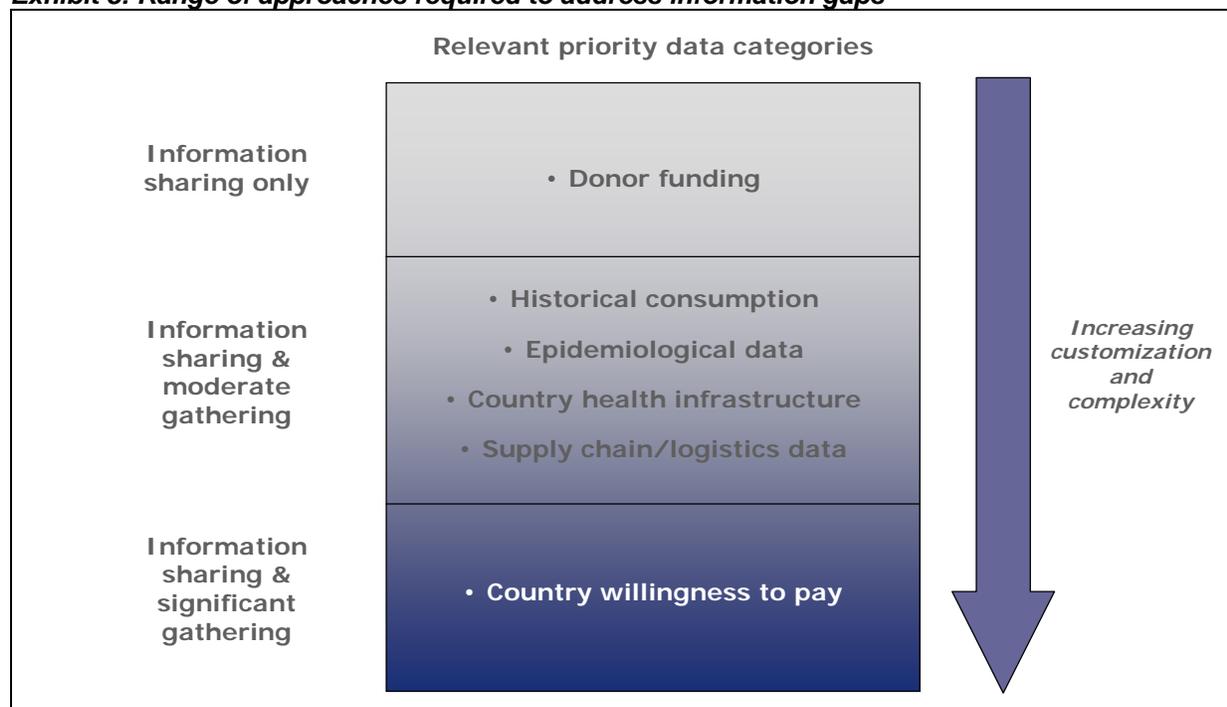
Closing high-priority gaps will require, at the very least, increasingly effective and systematic consolidation and dissemination of existing information. To this end, it is reassuring to note that there are several specific information sources that cut across multiple information categories, which could help focus information-gathering efforts. A summary of key information sources is shown below (*Note: A information-source database is currently under construction that will provide an extensive mapping of available data sources for the 17 information categories identified*):

**Exhibit 7: Sample of information sources** (*Note: data may or may not be publicly available*)

Providing data in 3 or more categories	Providing data in 1 -2 categories
Global Fund	PEPFAR
National Ministries of Health	GAVI
Pharmaceutical and device manufacturers	National NGOs/other program implementers
UNICEF	IAPSO
USAID	IDA
UNAIDS	Crown Agents
WHO	Center for Disease Control
World Bank	UN Population Division
	National Census
	UN Statistics Division
	DAC
	Axios
	UNFPA
	JSI

However, addressing the priority information gaps will require not only improved sharing of existing data, but will *also* require additional and explicit investments in gathering of “new” information – information that is not currently collected in any formalized or ongoing manner. We have conceptualized the solutions needed to address the gaps in each information category as a spectrum that moves from 1) information sharing, to 2) information sharing and moderate gathering of new information, to 3) information sharing and significant gathering of new information. The most simple solution – sharing existing information – is most appropriate for those information categories (such as international donor funding) that are least complex and that require relatively little customization of information. Conversely, the most effort in information gathering would be required in highly customized and complex information categories such as data on country willingness to pay.

**Exhibit 8: Range of approaches required to address information gaps**



**2. INFORMATION-SHARING MODELS: What are the current approaches to sharing information, and what is needed to better address forecast developer needs?**

As the prior section demonstrates, there exists a set of readily identifiable information consistently demanded by forecast developers—information that, if accurately recorded, effectively compiled, and clearly presented to forecast developers, would eliminate many avoidable information-related forecasting uncertainties. Yet though the “information wish list” is clear, current efforts to gather and share such information have been unable to satisfy the demands of those engaged in forecasting. Core forecast developers emphasize that certain primary data are not currently captured and therefore nonexistent for current purposes. Furthermore, many indicate that *existing* data are too often inaccessible, incomplete, or inaccurate. Data from one source are invariably inconsistent with those of another source, to the point that forecast developers have minimal confidence in their own ability to distinguish which data are reliable. The following section describes the current approaches to sharing information in developing markets, and contrasts these with models used to share similar information in the developed world context. Comparing developed and developing world “markets” for information lends insight into the viability of new information-sharing solutions in the developing world context.

**2.1. Developing world market overview: How does information sharing happen today in the developing world?**

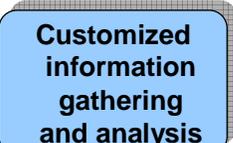
In recent years, resources devoted to addressing developing world health challenges have rapidly and drastically increased. Yet despite this growth in available resources and the intensity of public attention to these markets, difficulties persist in gathering accurate information about the resources, products, and regulatory environments in developing markets. Such limitations are becoming increasingly frustrating. Priority must be given to addressing information gaps, as they hinder not only the ability to create accurate demand forecasts but also the ability to make the many crucial product- and supply-chain investments that depend on accurate demand forecasts.

In response to these uncertainties, initiatives have begun to emerge to collect and disseminate information relevant to forecasting. These initiatives are distinct from previous initiatives in that the collection and dissemination of this type of information are these initiatives’ central function or at least

central to their mandates. And at the same time, existing initiatives have expanded the scope of the data that they provide to better meet the expanding needs of stakeholders. Yet despite these improvements, information gaps remain. One challenge is that while these initiatives themselves may focus on forecasting demand, they typically remain within existing organizations that have much broader mandates, and for which demand forecasting is a low priority.

Summarized below are some of the key players and the characteristics of recent initiatives that focus on information sharing and gathering.

**Exhibit 9: Developing-world model for pharmaceutical information sharing**

	<u>Key players</u>	<u>Market characteristics</u>	<u>Example organizations</u>
 <p><b>Information sharing</b></p>	<p><b>Disease-specific initiatives housed by or composed of key stakeholders</b> focused on sharing information</p>	<ul style="list-style-type: none"> <li>• Typically one major initiative per disease area</li> <li>• Often a consortium of key players, supported by a secretariat</li> </ul>	<ul style="list-style-type: none"> <li>•RH Supply Initiative</li> <li>•Roll Back Malaria; MMSS               <ul style="list-style-type: none"> <li>•AMDS</li> <li>•Stop TB</li> <li>•CHAI</li> <li>•PDPs</li> </ul> </li> </ul>
	<p><b>International and national public health entities</b> providing free data</p>	<ul style="list-style-type: none"> <li>• One main international information source (WHO)</li> <li>• Many national sources with varying levels of information</li> <li>• Disease-specific sources</li> </ul>	<ul style="list-style-type: none"> <li>•WHO</li> <li>•National MOH</li> <li>•UNAIDS</li> </ul>
 <p><b>Customized information gathering and analysis</b></p>	<p><b>Public entities</b> conducting surveys on specific populations and diseases</p>	<ul style="list-style-type: none"> <li>• Small number of global public players</li> <li>• Usually targeted to specific disease or population</li> </ul>	<ul style="list-style-type: none"> <li>•UNICEF</li> <li>•USAID</li> <li>•WHO</li> </ul>
	<p><b>Limited engagement from private firms</b> conducting customized research and analysis</p>	<ul style="list-style-type: none"> <li>• Global firms primarily focused on India, China, Brazil, and South Africa</li> <li>• Small number of regional firms in other areas</li> </ul>	<ul style="list-style-type: none"> <li>•IMS</li> <li>•Global Industry Analysts</li> </ul>

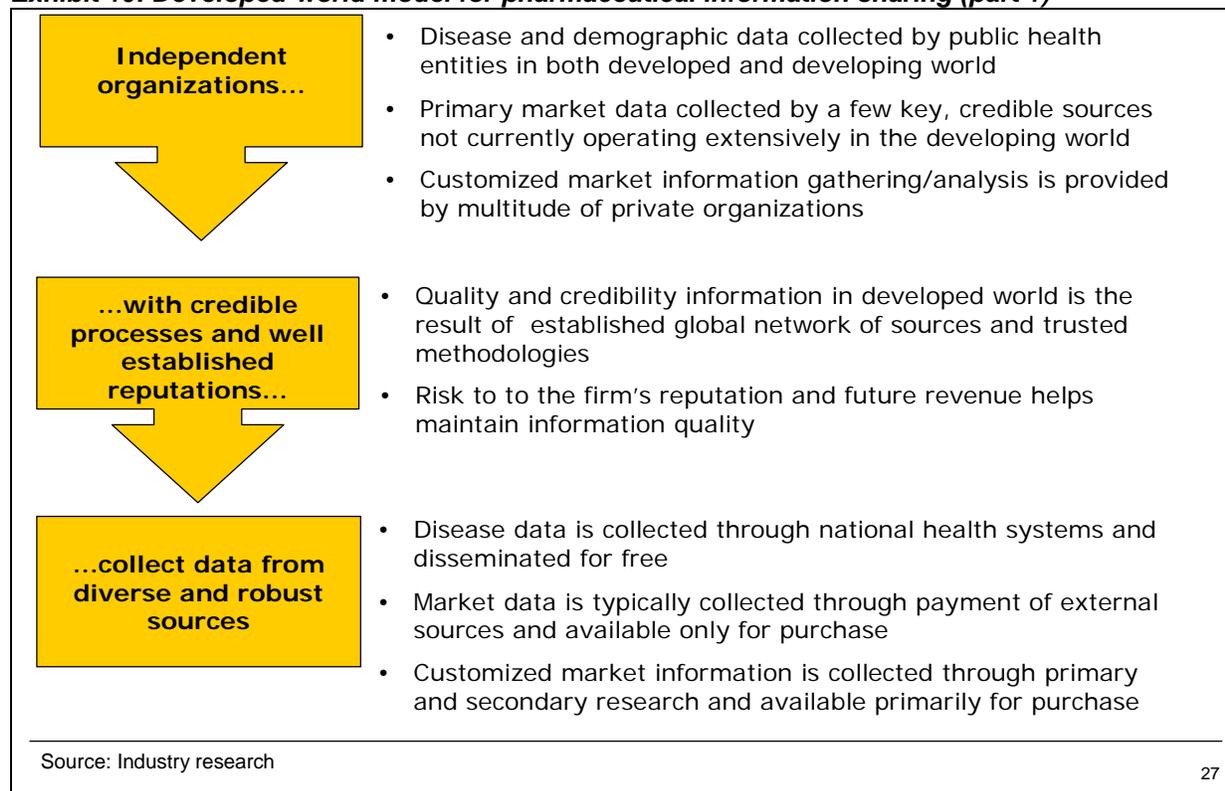
Source: Industry research

**2.2. Developed world market overview: What are the models for information sharing in the developed world?**

As noted by Harvard Business School professors Ananth Raman and V.C. Narayanan in “Aligning Incentives in Supply Chains,”<sup>3</sup> inaccurate demand forecasts are a frequent challenge for numerous product supply chains across the globe. Misaligned supply chain incentives are the key cause of poor demand forecasts, and Raman and Narayanan point out that an important root cause of such misaligned incentives is “hidden information.” Thus, information-sharing initiatives and organizations are a widely recommended approach to improving the ability of supply-chain stakeholders to forecast demand and more effectively manage the supply chain. It is therefore not surprising that there exists a multiplicity of organizations providing market and consumption information for pharmaceutical products, and that such information resources exist in a wide variety of other developed world product and service markets. The market for information in the developed world is highly evolved and serves the diverse needs of players across the health market, as summarized below:

<sup>3</sup> Harvard Business Review (11/04)

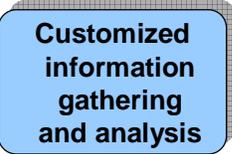
### Exhibit 10: Developed-world model for pharmaceutical information sharing (part 1)



There are many organizations that play in the pharmaceutical information market, yet much insight into how firms in this sector operate can be gained through examination of the business models employed by two of leading players – specifically, IMS Health and Datamonitor. IMS Health is one of the most significant players in the market, provides some of the most detailed available data on product consumption - a critical and frequent input in the forecasts and market analysis of pharmaceutical suppliers and buyers, predominantly those concerning US, European, and major Asian and Latin American markets. Similarly, Datamonitor is a leading player that provides market analysis about a wide range of global markets, including pharmaceuticals. *Annex 4* provides a detailed review of the operating models and information offerings of these two key players.

Summarized below the key players and market characteristics defining information sharing models in developed-world pharmaceutical markets, gained from examination of IMS Health, Datamonitor and other key players:

**Exhibit 11: Developed-world model for pharmaceutical information sharing (part 2)**

	<u>Key players</u>	<u>Market characteristics</u>	<u>Example organizations</u>
 <p><b>Information sharing</b></p>	<p><b>Private firms</b> provide consumption, market, and product information</p>	<ul style="list-style-type: none"> <li>• Few players offer consumption data</li> <li>• Many firms provide product and market information</li> <li>• Data sold at a fee</li> </ul>	<ul style="list-style-type: none"> <li>•IMS</li> <li>•NDC</li> </ul>
	<p><b>National public health entities</b> provide epidemiological, demographic, regulatory process/status, and treatment guidelines</p>	<ul style="list-style-type: none"> <li>• Public entities set standards and provide free data</li> <li>• Private firms offer synthesized data</li> </ul>	<ul style="list-style-type: none"> <li>•CDC</li> <li>•NHS</li> <li>•Decision Resources</li> <li>•Wide range of consulting firms</li> </ul>
 <p><b>Customized information gathering and analysis</b></p>	<p><b>Private firms</b> focused on research and analysis of key market data, including product trends and purchaser behavior</p>	<ul style="list-style-type: none"> <li>• Many players in each market</li> <li>• Mix of generalists and specialized organizations focused on specific products or markets</li> <li>• Analysis sold at a fee</li> </ul>	<ul style="list-style-type: none"> <li>•TNS</li> <li>•Datamonitor</li> <li>•Cambridge Pharma</li> <li>•Global Industry Analysts</li> <li>•Wide range of consulting firms</li> </ul>

Source: Industry research

### 2.3. Implications: What models are needed to better serve the developing world?

The market for information in the developed world is highly evolved and serves the diverse needs of players across health-product markets. Can a comparable market for information exist in the developing world? Given the significant increase in resources and growth in markets for these products, the answer must be yes. But how will this be achieved? Some of the lessons from the developed world are particularly instructive.

First, in both the developing and developed worlds, public organizations provide key demographic and epidemiological data. However, in the developed world, these data are perceived as more robust and credible and benefit from significantly greater resources invested in their collection, validation, and dissemination. Improving the quality of data provided by public health entities and collected via national censuses providing this data for the *developing* world would improve the ability of forecast developers to predict demand in those markets. It should be noted, that the timeline and investment for improving such information is significant, and that, as discussed below, there are other opportunities for more rapid improvements through the use of new information-sharing models for product and market data.

Several observations about models in the developed world for information sharing and gathering provide particular insight into opportunities to improve rapidly the availability of information for developing world markets.

1. The most significant difference between the developing and developed world markets for health-product information is the presence in the developed world of a diverse set of independent organizations dedicated to collecting a wide range of data relevant to forecasters *as their primary raison d'être*:
  - Primary market data are collected by a few key, credible sources not currently operating extensively in the developing world (IMS Health)

- Customized market information gathering/analysis is provided by multitude of private organizations
2. These organizations are focused exclusively on information collection and analysis and need to build reputations with their customers for the quality of their information to succeed:
    - Quality and credibility of information is the result of established global networks of sources and trusted methodologies
    - Risk to the firm's reputation and future revenue helps maintain information quality
  3. Finally, these organizations collect data from diverse sources and serve as neutral and objective information collectors where direct sharing of information across stakeholders might be impossible or cumbersome:
    - Market data is typically collected through payment of external sources and available only for purchase
    - Customized market information is collected through primary and secondary research and available primarily for purchase

These organizations are distinct from initiatives in the developing world, which often engage in the gathering and sharing of information only as peripheral activities, and which often share information via consortia or collaborations where there is no one party responsible for the quality or utility of the data collected and disseminated.

#### 2.4. Concepts to consider in the design of information networks

In addition to learning from the current design of developed world information markets, it is also worthwhile to step back and examine academic research on information networks and the models that are most appropriate given the particular circumstances of an industry or sector.

The MIT Sloan Business Review article “Managing Your Portfolio of Connections”<sup>45</sup> compares “virtually” and “socially embedded” networks. “Virtually embedded” networks are based on online forums that allow interaction through numerous parties via the Internet. “Socially embedded” networks are based on individual relationships among individuals in key organizations that hold and use information. The article argues that “virtually embedded” networks have distinct benefits over “socially embedded” networks in situations where industry dynamics are rapidly changing, in the sense that particular organizations—or even individuals with whom information needs to be exchanged—are changing (see Exhibit 15 below for an illustrative framework). Therefore, while directly facilitated interactions among global health stakeholders (an example of a “socially embedded network”) may be useful in sharing a limited amount of sensitive or complicated datasets, an online resource for information sharing (an example of a “virtually embedded network”) is perhaps more appropriate for a diverse set of information to be shared by a continually evolving set of players in a dynamic market.

Some of the applicable benefits of virtual networks noted are that they:<sup>6</sup>

*“...enable easy and quick access to a vast range of individuals and organizations with specialized information, skills and experience...”*

*“... are not constrained ...ties can be formed as easily with someone halfway around the world as with the person next door.”*

*“...can be very effective because the broad set of values associated with the Internet tends to encourage the frank exchange of information.”*

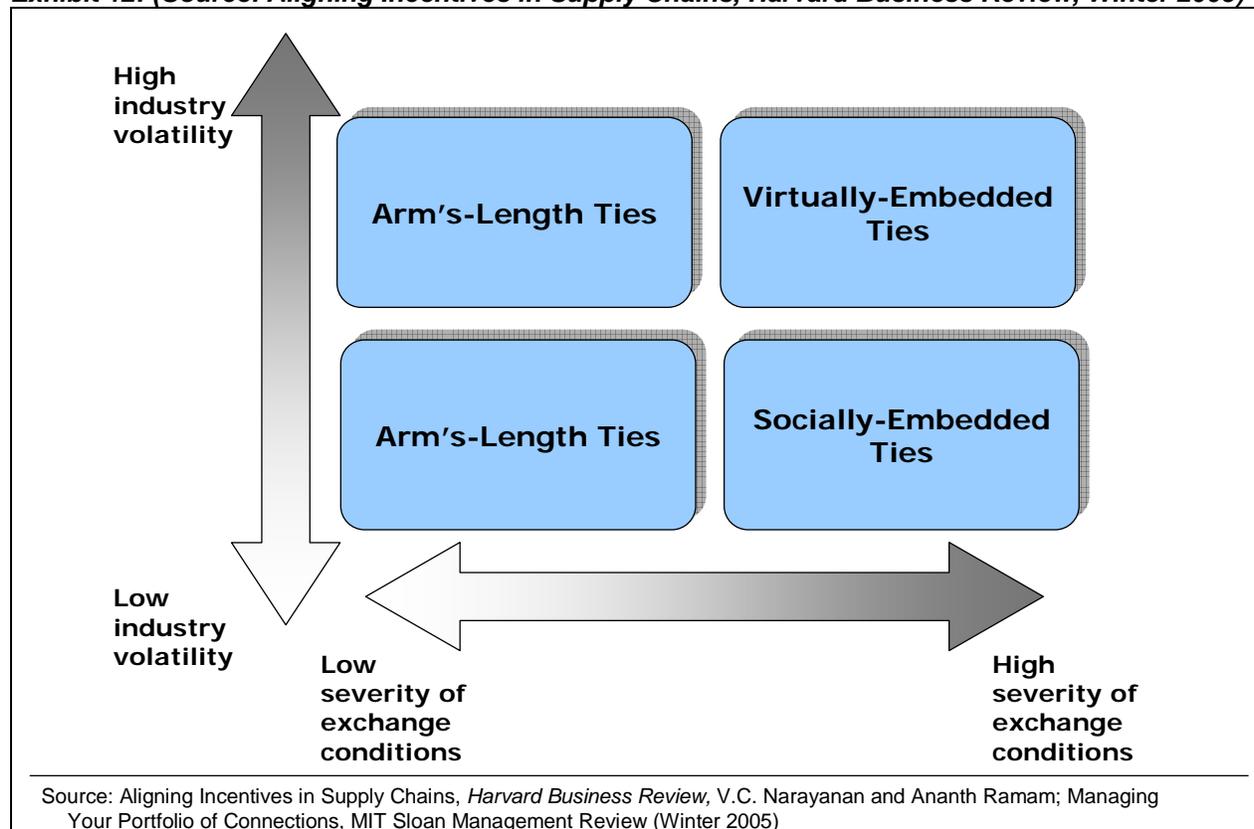
*“...facilitate...the widespread dissemination of relatively detailed information that can be either public or personal. One feature of virtually embedded ties is communication efficiency.”*

<sup>4</sup> Aligning Incentives in Supply Chains, *Harvard Business Review*, V.C. Narayanan and Ananth Raman)

<sup>5</sup> Managing Your Portfolio of Connections, MIT Sloan Management Review (Winter 2005)

<sup>6</sup> Managing Your Portfolio of Connections, MIT Sloan Management Review (Winter 2005)

**Exhibit 12: (Source: *Aligning Incentives in Supply Chains*, Harvard Business Review, Winter 2005)**



At the same time, the literature on supply chains also discusses the benefits of independent third-party information providers in sharing information among players who are unfamiliar or lack sufficient trust or capacity to share information directly. As Professor Ananth Raman points out in the *Harvard Business Review*, “When companies realize from the outset that working with partners will not be easy, they can use intermediaries to prevent supply chains from breaking down... The presence of an intermediary can help align the incentives of the two parties.”<sup>7</sup>

A thorough review of the relevant academic research, particularly the examples cited above, points us to the particular utility of online information sharing models and third-party providers. This knowledge, combined with the experience of the existing structure of health-product information sharing efforts in the developed and developing world, provide the basis for the information solutions laid out in the next section.

### 3. SOLUTION OPTIONS

#### 3.1. Three Information Models Offer Solutions

Based on the lessons learned from developing and developed world approaches to information sharing, this section proposes three solution models that are appropriate to the information challenges that have been explored in this document. These potential solutions fall along a spectrum ranging from relatively informal and collaborative efforts to the formal creation of new independent information-collection organizations or initiatives. Each of models is described briefly below in a generic manner. The

<sup>7</sup> *Aligning Incentives in Supply Chains*, Harvard Business Review, V.C. Narayanan and Ananth Ramam; Managing Your Portfolio of Connections, MIT Sloan Management Review (Winter 2005)

subsequent sections more concretely define the approach and structure most applicable in our particular context.

It is important to note that rather than a single model, a combination of the models described below may be required to effectively address the information challenges identified.

### *1. Multi-stakeholder Forum*

The term “multi-stakeholder forum” is used to describe any of a range of initiative types where representatives from key stakeholder organizations come together to share information in an episodic manner. These initiatives typically involve in-person meetings and often include supplementary conference calls, email interchanges, and possibly a website to facilitate the exchange of information. These initiatives or consortia are maintained through direct social ties (including face-to-face contact) among the individuals involved in order to build trust, exchange detailed and proprietary data, and engage in joint problem solving.

Examples of developing world global health initiatives that use multi-stakeholder forums are the Reproductive Health Supply Initiative, the Roll Back Malaria Partnership, and the Measles Partnership.

#### Key Organizational Characteristics:

- Membership typically limited to a set of key stakeholders.
- May be set up as an informal grouping of organizations, leveraging existing staff from member organizations to set up and maintain interactions.
- May not require a new institutional structure, or may require only a lean secretariat to maintain the initiative.

#### Advantages:

- Members are able to share complex and/or proprietary data that they might not otherwise share.
- Face-to-face interactions can build trust and help participants gain a shared understanding of the challenges faced by others.
- Opportunities are created for joint problem solving with clear reciprocity.

#### Disadvantages:

- Limited network restricts access to external information.
- Forum requires significant time and resources to maintain.
- It is susceptible to disruption from turnover and industry transformation.

### *2. Online Information Collaborative*

An “online information collaborative” is any virtual network used to collect and share information across a diverse set of players. The term collaborative is used here to indicate a dynamic system in which information is both input and used by its participants. Such an information clearinghouse need not rely solely on information from its members, but it is expected that the members will play an active role in information generation, ensuring a diverse set of sources, improved access to dynamic and up-to-date information, and lower maintenance costs.

Examples of online information collaboratives are varied. Wikipedia is the perhaps the premier information collaborative, but consumer websites such as Citysearch also depend on ongoing user input and ratings.

#### Key Organizational Characteristics:

- Membership can be easily limited, expanded, and/or made available to the general public, depending on desired website design. Members’ ease of entry and exit is high.
- Organizationally, the collaborative requires a host that maintains the website, designs its structure, ensures quality control, and supplements content provided by users (to the extent desired or necessary). The host may also need to market the website to users and to demonstrate the clear value of the information and/or services provided.

- Depending on the size, scope, and complexity of the information network, it may entail one to several dozen staff members employed by the host organization to manage the initiative.

Advantages:

- Provides a high degree of transparency.
- Has the potential to engage a very wide and dynamic set of stakeholders.
- Provides a highly efficient means by which to exchange information.
- Enables some degree of community-based problem solving.

Disadvantages:

- Highly dependent on the willingness of key players to engage.
- Carries a significant risk of participants losing interest over time if substantial effort is not made to keep engagement and demonstrate benefit of the product.
- Lacks clear reciprocity, so that members may feel uncomfortable revealing proprietary data.

### 3. *Independent Third-Party Information Provider*

An “independent third party provider” is a model in which a third party is designated to be responsible for collecting and disseminating information. In this model, an intermediary or middleman plays an integral role in collecting information that individual players might be unable to collect on their own or find cumbersome to share with others. A third-party provider may engage in a range of activities, including the simple collection of existing information relevant to the market or original research to gather information that is not currently collected by existing players.

Much of the information currently provided in the developed world and in some of the developing world is shared via third-party information providers. Private-sector examples include IMS Health, Datamonitor, Axios, and TNS.

Key Characteristics:

- Third-party information providers may distribute information to a wide range of audiences. They may do so free of charge, at a fee to any client, or at a fee to a consortia that funds a one-time or ongoing set of information-collection activities.
- Organizationally, a third-party information provider must have dedicated staff with information collection and/or gathering (e.g. market research) expertise. The organization also needs to cultivate and maintain a network of information sources. Finally, the organization must also be able to successfully market and disseminate the information, and be responsive to changing customer needs.
- Depending on the size, scope, and complexity of the information required such an organization typically requires dozens to hundreds of staff members.

Advantages:

- Can collect, synthesize, and disseminate information that individuals may not be willing or able to share independently.
- Can serve as a concentrated hub of expertise in information sharing and gathering.
- Can focus explicitly on information sharing in a specific sector and be highly responsive to customer needs.

Disadvantages:

- A third party must prove credibility to all players.
- The third party must also find a viable business model to be effective.
- The third party may not be able to respond as dynamically to a changing environment as an online collaborative where all members can contribute new information as soon as it is available.

### **3.2. Applying Solution Models: Description of Specific Recommended Solutions**

In examining the needs of forecast developers, it becomes apparent that rather than requiring a single model, a combination of the models described above could best address the information challenges identified. The following are the three recommended initiatives, which, applied individually or in

conjunction, could facilitate information sharing and forecasting in health products in developing world markets.

<b>1. Online Information Collaborative: GlobalHealthForecastingInfo.org</b>	
<i>Description/Approach to Information Sharing &amp; Gathering</i>	<p>GlobalHealthForecastingInfo.org would be a user-friendly online data repository, providing users with information regarding the availability, quality, and potential uses of the information categories that constitute the most frequent inputs into demand forecasts. However, rather than housing the data itself, the website would serve as a focal point for the collection and exchange of data descriptors (meta-data) that would: 1) facilitate awareness and access to various sources of existing data, 2) encourage debate and knowledge sharing regarding completeness, validity, and possible applications of various data, 3) provide a forum in which to determine common data standards and collection methods, 4) allow for future collaboration to gather and analyze, and 5) allow for user-discussion around the most pressing issues, e.g. differences among forecast methodologies. The website would be built with an initial set of information identified by the team managing the website. Users would then be able to add sources and comments on data quality.</p>
<i>Participants</i>	<p>GlobalHealthForecastingInfo.org would not have in-house data-gathering capabilities; however, organizations with data-gathering capabilities could easily post data about their available reports or information-gathering services on the website. <i>Annex 5</i> provides a concept note describing in more detail the pilot of GlobalHealthForecastingInfo.org website (termed an Online Inventory) that is planned for launch by CGD on behalf of the Working Group. GlobalHealthForecastingInfo.org would require users to sign up for membership, but membership would be free or cost a nominal fee. Membership would be available to any interested individual or organization.</p>
<i>Incentives for Participation/ Information Sharing by Key Stakeholders</i>	<p>The success of an online information-sharing resource is defined by how many users access the resource. To succeed in building a strong base of users and contributors, the website will need to start with a valuable base of initial information, have a simple, user-friendly interface, and appropriate functionality (e.g. by categorizing data by country or region, having clear formatting, etc.). The website will also need to be extensively marketed to likely users and gain the reputation as the starting point for any demand forecaster in global health.</p>
<i>Structure/Governance</i>	<p>Finally, the website would require not only that users access data, but that over time they contribute to the website as well. Recognition for contributing data and other incentives could be considered, as would indirect or direct peer pressure to encourage members who have not yet posted critical information. GlobalHealthForecasting.org could be managed by a small team with web-development and knowledge-management expertise. It is expected that such a team could operate within an existing organization with web-development expertise and be contracted by an appropriate global health stakeholder (e.g. CGD, as would occur in the pilot website).</p>
<i>Quality Mechanism</i>	<p>GlobalHealthForecasting.org would maintain the quality of the data posted on its website in two ways:</p> <ol style="list-style-type: none"> <li>1) Periodic review of new information by the website-management staff</li> <li>2) Ratings by users of the accuracy of information provided on the site and notification of the website team of any inaccurate or inappropriate posts.</li> </ol>
<i>Expected Cost</i>	<p>It is expected that this would be the least costly of the three initiatives relative to the amount of data it would provide. The expected cost of GlobalHealthForecasting.org will be determined via cost estimates in response to the concept note. (See <i>Annex 5</i>)</p>

## 2. Multi-Stakeholder Forum: The Global Health Demand Forecasting Information Forum

<i>Description/Approach to Information Sharing &amp; Gathering</i>	<p>A multi-stakeholder forum approach to sharing developing market demand forecasting information would operate via a mix of stakeholders similar to those currently represented on the Global Health Forecasting Working Group (and would likely include some of the existing members). This group would have periodic meetings, share an agreed-upon set of information via email or the Internet, and facilitate improved linkages and understanding of forecasting challenges across all stakeholders. This group could also work toward setting data standards across Information Sharing Initiative members or even toward the development of integrated systems.</p> <p>Such a group would focus on sharing information that participants already have rather than gathering new information. Furthermore, the focus would be on information that is relatively complicated and publicly unavailable, as these are the types of data that may necessitate direct interaction among players, rather than online sharing.</p>
<i>Participants</i>	<p>The Information Sharing Initiative would include representative from suppliers, major international buyers/procurement agents, developing country buyers, PDPs, and donors.</p>
<i>Incentives for Participation/ Information Sharing by Key Stakeholders</i>	<p>Participants would join the initiative with the expectation that it would enable them to gain better market data. Participants would be expected to share certain information as a condition to joining the initiative and would likely become more open to sharing information as trust and interaction between members grows.</p>
<i>Structure/Governance</i>	<p>This initiative would not require a formal secretariat or governance structure but would instead be hosted by one of the participating organizations, with a small number of staff involved in setting up meetings and contracting out activities as needed (e.g. managing the group's website). Working groups or committees within the initiative might take on specific tasks or focus on specific information requirements.</p>
<i>Quality Mechanism</i>	<p>No formal quality review process would exist, as direct data exchange would occur among members. However, members would be encouraged to identify and address data quality issues.</p>
<i>Expected Cost</i>	<p>Major costs associated with this initiative would be the time spent by members and travel expenses. Relative to the data provided by this initiative, it is expected that it would be the most costly of the three recommended initiatives.</p>

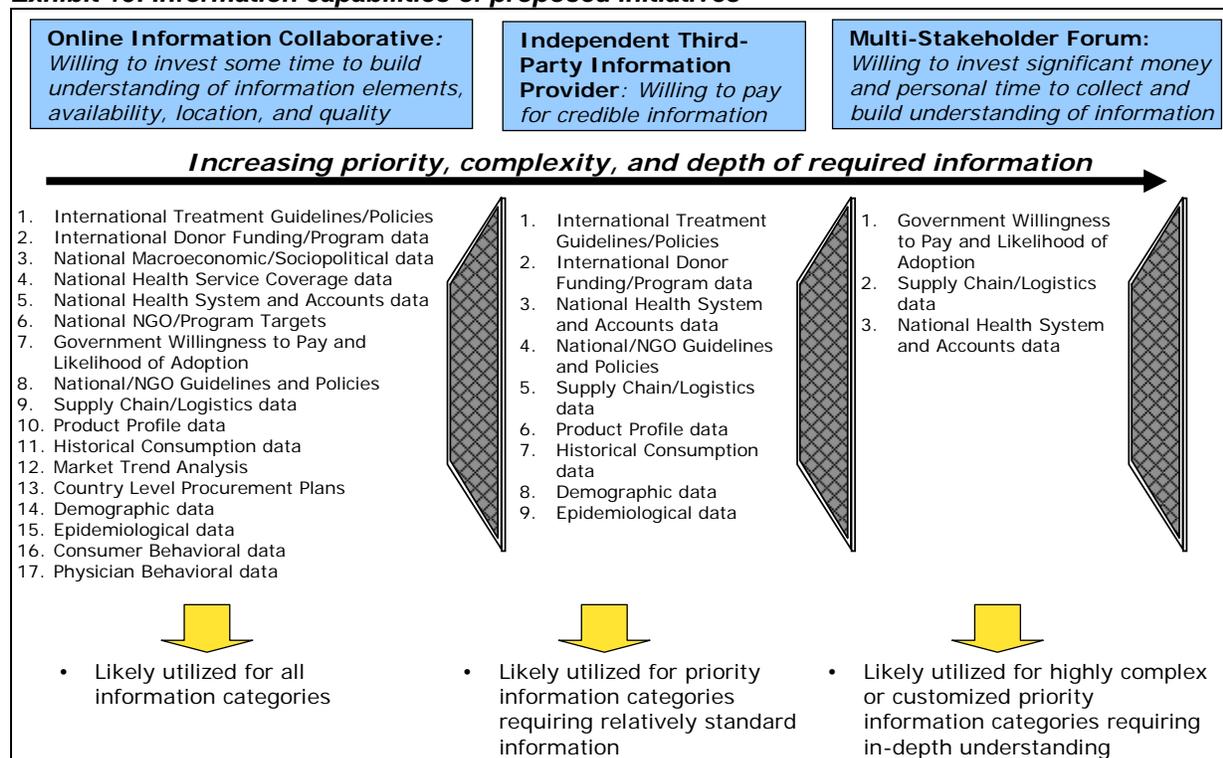
## 3. Independent Third-Party Information Provider: The Global Health Information Service

<i>Description/Approach to Information Sharing &amp; Gathering</i>	<p>The use of an independent third party to collect priority data categories would build upon an existing industry of health-product information providers. As discussed above, these information providers often have limited presence in the developing world, operating only in major markets. However, their approach to information collection and their network of customers (which count among them all major pharmaceutical suppliers) can be leveraged to gather and share information in this new context.</p> <p>The Global Health Information Service would consist of one or multiple information providers, offering a wide range of information sharing and gathering capabilities to its customers, depending on the funding available, the business model designed for the service, and priorities of forecast developers. It is anticipated that, for particular categories of information, such as historical consumption data, a single, authoritative, and widely</p>
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	<p>acknowledged source will be required to provide data credibility. Other types of information, such as market research, may conversely benefit from the existence of various providers with various regional, functional, or substantive advantages in information gathering.</p> <p>Such third-party providers with dedicated staff and a singular focus on meeting the information needs of forecast developers would enable the synthesis and collection of new and existing data in a comprehensive manner that is simply not attainable otherwise, whether through existing initiatives or through a new voluntary online collaborative such as GlobalHealthForecastingInfo.org. Additionally, such an objective third-party provider, if it possesses appropriate forecasting expertise and a deep understanding of the data provided, has the potential to offer not only credible forecasting <i>data</i>, but credible input as to appropriate forecasting <i>methods</i>.</p> <p><i>Annex 6</i> is an overview of the Request for Information that will be issued by the Working Group to identify organizations that could likely operate the Global Health Information Service, and provides a better understanding of the likely scope and cost of their services.</p>
<i>Participants</i>	<p>It is expected that the core developers of forecasts, and in particular suppliers, would be the customers of this information service.</p>
<i>Incentives for Participation/Information Sharing by Key Stakeholders</i>	<p>The Global Health Information Service would offer incentives that are similar to what current third-party information providers use to collect information. These incentives include paying information sources and/or providing them with data in return for their participation. If a consortia is formed to contract the Information Service or to form an advisory board, those players might also be obligated to share information.</p>
<i>Structure/Governance</i>	<p>As discussed above, the Global Health Information Service could be managed by an existing organization with expertise in the collection and dissemination of health-product and market information. This organization would be selected via a competitive process and contracted by a stakeholder in global health with sufficient expertise and flexibility to manage such a relationship with an external provider. A group of key stakeholders could constitute an Advisory Board to the Service and be obligated to share certain data.</p>
<i>Quality Mechanism</i>	<p>The business model of the Information Service would need to be determined. The options include a fully funded model where information is distributed free of charge, or a fee-for-service model in which the service is subsidized, but where customers would still be required to pay a fee depending on the type of information they would like to access.</p> <p>The contractor would set specific performance and quality metrics that the Global Health Information Service would be expected to achieve. If it performs below expectation on these measures, the contractor could take a variety of actions, including switching suppliers.</p>
<i>Expected Cost</i>	<p>The cost of this initiative relative to the data provided is expected to be more than the online resource but less than the Information Forum. The cost of the Global Health Information Service will be determined based on responses to the Request for Information that will be issued by the Working Group.</p>

Finally, these three recommended initiatives will each need to generate all or some of the 17 information categories identified earlier in this report. The diagram below shows the expected information categories that each solution would cover based on the cost and operating model of the initiative.

### Exhibit 15: Information capabilities of proposed initiatives



#### 4. CONCLUSION: Linking information needs and models to Working Group recommendations

These three recommended solutions could, independently or in conjunction, address the critical information challenges faced by demand forecast developers in the developing world. The Working Group must ultimately determine which of these potential solutions it will endorse, and consider accordingly how best to implement, coordinate, and manage the recommended solutions. In particular, consideration must be given to the following questions:

- How does the Working Group rate the feasibility (political, institutional, and technical) of each solution? What conditions are required for successful execution, and what barriers must be overcome?
- Of the three information-sharing solutions identified, which solution or combination of solutions does the Working Group believe best address the information challenges identified? If multiple solutions are endorsed, what is the preferred order of implementation, and what degree of coordination is required?
- Which initiatives or organizations are best positioned, and most willing, to lead the agreed effort(s)? What is required from the lead player and from other stakeholders to make the initiative(s) selected a success?
- What management, incentive, and governance structures are most appropriate for the preferred solution(s)? If multiple solutions are endorsed, should a single organization or body oversee or manage initiatives, or should they be managed separately?
- What business models should be considered for the selected solution, given initial funding needs and goals of longer-term sustainability?

The challenge of effectively forecasting demand for health products in the developing world, and its ultimate impact on lives, cannot be underestimated. The solutions proposed in this paper could play an important role in improving the ability of all players to better predict demand and ultimately enable them better to serve the markets in the developing world that continue to receive a wholly insufficient supply of new and existing lifesaving products.

### **Annex 1: Interviews Conducted**

<b>Name</b>	<b>Organization Represented</b>
Hans Rietveld	Novartis
Krista Thompson	Beckton Dickinson
Rob Chisholm	Ranbaxy
Donne Newbury	Bristol Meyers Squibb
Marcus Soalheiro	Nortec Quimica
Saul Walker	International Partnership for Microbicides
Wendy Wilson, Christine Mulshine	BIO Ventures for Global Health
Nina Schwalbe	TB Alliance
Gian Gandhi	International AIDS Vaccine Initiative
Angeline Nanni	PneumoADIP
Stephen Jarrett	UNICEF
Edward Wilson	John Snow, Inc.
Mark Rilling	USAID
Elisabetta Molari	Global Fund for AIDS, TB and Malaria
Andrea Longhi	National Health Service

### **Annex 2: Analysis and Methodology**

1. Information Needs Assessment: Overview of information needs, priorities, and gaps in demand forecasting for developed world products; profiles of priority information categories (sources, users, and gaps)
  - a. Mapping forecasting processes across working group members (and therefore across players, products, disease areas, and forecast time horizons)
  - b. Expert interviews
  - c. Analysis of a survey of Working Group members on Information Needs, Gaps and Sources.
2. Information-Sharing Models: Examination of potential approaches to improving information sharing for developing world products, including using applicable models from the developing world
  - a. Compilation of research on existing information-sharing models in the developing and developed worlds
3. A range of information-sharing and gathering solutions considered by the Working Group

### Annex 3: Profile of Priority Information Categories

#### Information Sources, Users, and Gaps

Information Category	Sources	Users	Gaps	Implications for Information-Sharing Solutions
<b>Historical Consumption</b>	<ul style="list-style-type: none"> <li>• International buyers</li> <li>• National buyers</li> <li>• Suppliers</li> <li>• PDPs</li> <li>• Funders</li> </ul>	<ul style="list-style-type: none"> <li>• Suppliers</li> <li>• PDPs</li> <li>• International buyers</li> <li>• National buyers</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple potential sources of historical data exist per disease, but little of the existing information is effectively or systematically shared</li> <li>• Data that are shared are not generally consolidated by product and must be compiled across sources</li> <li>• Even for individual sources, data are largely unavailable or incomplete (e.g. Global Fund Price Reporting Mechanism is currently tracking only ~10% of purchases)</li> </ul>	<ul style="list-style-type: none"> <li>• Historical consumption data are used by, and can be sourced from, both buyers and suppliers</li> <li>• Suppliers would be the easiest source from which to compile information, because they are more concentrated in the market and maintain fairly standardized records of sales</li> </ul>
<b>International Donor Funding</b>	<ul style="list-style-type: none"> <li>• Funders</li> <li>• National buyers</li> </ul>	<ul style="list-style-type: none"> <li>• Suppliers</li> <li>• PDPs</li> <li>• International buyers</li> <li>• National buyers</li> </ul>	<ul style="list-style-type: none"> <li>• Key users have little access to product-specific funding forecasts</li> <li>• A consolidated view of funding that encompasses multiple funders frequently is not available by disease</li> <li>• Lack of transparency into country procurement processes, financing, and funds flow</li> <li>• Significant uncertainty in the reliability and timing of funding: <ul style="list-style-type: none"> <li>○ Timeframes of future funding commitments often too short</li> <li>○ Uncertainty in timing between approval, disbursement, and expenditure</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Efforts by funders are required to: <ul style="list-style-type: none"> <li>○ Provide consistent reporting across diseases and donors</li> <li>○ Provide relevant country and product-level information</li> <li>○ Increase timeframe of funding-commitment information</li> </ul> </li> </ul>
<b>Epidemiological</b>	<ul style="list-style-type: none"> <li>• National government and surveillance data</li> <li>• International agencies</li> <li>• Other (e.g. clinical research)</li> </ul>	<ul style="list-style-type: none"> <li>• Suppliers</li> <li>• PDPs</li> <li>• International buyers</li> <li>• National buyers</li> </ul>	<ul style="list-style-type: none"> <li>• Disease data for the developing world is inconsistent across sources (e.g. a recent attempt to compile HIV, TB, and malaria statistics for 10 to 12 countries revealed inconsistencies among UN, WHO, and country data)</li> <li>• Need for better projections of disease evolution and patient flow over time</li> <li>• HIS data is often unavailable or incomplete <ul style="list-style-type: none"> <li>○ Inconsistent reporting from health facilities to districts to MOH</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• National buyer investments are required for improved surveillance systems</li> <li>• International sources should address discrepancies in disease data</li> </ul>

			<ul style="list-style-type: none"> <li>○ Typically does not include NGO facilities</li> </ul>	
<b>National Health System and Accounts</b>	<ul style="list-style-type: none"> <li>• National government</li> <li>• Program implementers/distributors</li> <li>• International agencies</li> <li>• Other (e.g. facility surveys, logistics assessments)</li> </ul>	<ul style="list-style-type: none"> <li>• Suppliers</li> <li>• PDPs</li> <li>• International buyers</li> <li>• National buyers</li> </ul>	<ul style="list-style-type: none"> <li>• According to WHO, of 192 WHO member countries, only 39 have sufficient health infrastructure information <ul style="list-style-type: none"> <li>○ 92 have only census data, old survey data, or no data at all</li> </ul> </li> <li>• Inadequate data as a result of infrequent country health infrastructure assessments and projections</li> </ul>	<ul style="list-style-type: none"> <li>• Existing data within international agencies, national governments and programs could be better compiled and organized</li> <li>• Significant long term investment needed to support additional, more frequent country health infrastructure assessments</li> </ul>
<b>Supply Chain/ Logistics</b>	<ul style="list-style-type: none"> <li>• National buyers</li> <li>• International buyers</li> <li>• Other (e.g. customized research)</li> </ul>	<ul style="list-style-type: none"> <li>• Suppliers</li> <li>• PDPs</li> <li>• International buyers</li> <li>• National buyers</li> </ul>	<ul style="list-style-type: none"> <li>• Supply chain/logistics data such as inventory quantity and location are often unavailable, as systems are not in place to manage supply chain.</li> <li>• Manual maintenance of records at the facility level makes compilation and analysis difficult</li> <li>• Lack of accurate data at lower levels in the supply chain</li> </ul>	<ul style="list-style-type: none"> <li>• Buyer data could be shared in a more systematic manner</li> <li>• Investment also required in buyer systems to improve data reliability</li> </ul>
<b>Country Willingness to Pay and Likelihood of Adoption</b>	<ul style="list-style-type: none"> <li>• National buyers</li> <li>• International buyers</li> <li>• Funders</li> </ul>	<ul style="list-style-type: none"> <li>• Suppliers</li> <li>• PDPs</li> <li>• International buyers</li> </ul>	<ul style="list-style-type: none"> <li>• Data gathering is conducted entirely through proprietary, customized research projects that are not shared</li> <li>• Limited number of expert providers of research and analysis exist in the developing world health market</li> </ul>	<ul style="list-style-type: none"> <li>• Customized research will continue to play an important role</li> <li>• Potential opportunity to share core information across players</li> </ul>
<b>International Treatment Guidelines</b>	<ul style="list-style-type: none"> <li>• WHO</li> <li>• <i>Pre-approval process</i></li> <li>• <i>Approved treatment guidelines</i></li> <li>• <i>Essential Drugs List</i></li> <li>• Global Fund</li> <li>• PEPFAR</li> <li>• PMI</li> </ul>	<ul style="list-style-type: none"> <li>• Suppliers</li> <li>• PDPs</li> <li>• International buyers</li> <li>• National buyers</li> </ul>	<ul style="list-style-type: none"> <li>• National treatment guidelines and/or program protocols do not always exist</li> <li>• Distinct national guidelines, protocols and processes by country makes it difficult to know which product is registered where, find the status of regulatory approval for registered products, and understand associated regulatory requirements (e.g. OTC vs. prescription) and other guidelines (e.g. acceptable sources of emergency resupply) across various countries. Compiling this data is often a time-intensive manual process</li> </ul>	

## Epidemiological Data: Profile and Gaps

<p><b>Description:</b> Epidemiological data by country and target population including estimates and projections of incidence, prevalence, mortality and morbidity</p>	<p><b>Key Sources of Data:</b></p> <ul style="list-style-type: none"> <li>• WHO</li> <li>• Ministries of Health             <ul style="list-style-type: none"> <li>-Particularly Health Information System (HIS) data</li> </ul> </li> <li>• UNAIDS</li> <li>• CDC</li> <li>• UNICEF             <ul style="list-style-type: none"> <li>-Particularly Multiple Index Cluster Surveys (MICS)</li> </ul> </li> <li>• Incidence studies (in preparation for phase III trials)</li> <li>• Independent research</li> </ul>
<p><b>Users that prioritize this element:</b>  <b>Overall importance 4.6</b></p> <ul style="list-style-type: none"> <li>• # 1 priority information element overall and #1 for each individual player and forecast type</li> <li>• Suppliers             <ul style="list-style-type: none"> <li>-Strategic Global Demand Forecasts</li> <li>-Sales Forecasts</li> </ul> </li> <li>• Buyers (International Procurement agents/National program implementers and distributors):             <ul style="list-style-type: none"> <li>-Strategic forecasts*</li> <li>-Procurement plans</li> </ul> </li> </ul>	
<p><b>Gaps Identified:</b>  <b>Overall performance: 3.5</b></p> <ul style="list-style-type: none"> <li>• <b>Availability:</b> <ul style="list-style-type: none"> <li>- HIS data is often unavailable or incomplete as a result of inconsistent reporting from health facilities to districts to the ministry of health. Such reporting varies in completeness and timeliness and often does not include NGO facilities.</li> </ul> </li> <li>• <b>Quality:</b> <ul style="list-style-type: none"> <li>-Disease data for the developing world is inconsistent across sources (e.g. recent attempt to compile HIV, TB, and malaria statistics across 10-12 countries revealed inconsistencies between UN, WHO, and country data)</li> <li>-Need for better projections of disease evolution and patient flow over time</li> </ul> </li> </ul>	

Source: Working Group and Expert interviews; Working Group Survey on Information Needs and Gaps  
 \* Note: Buyer strategic demand forecasts were not represented in survey responses

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## Treatment Guidelines/Policies Data: Profile and Gaps

<p><b>Description:</b> Information on product regulatory process, treatment guidelines, standard test regimens, standard techniques, and protocols at the global, national, and local/program levels</p>	<p><b>Key Sources of Data:</b></p> <ul style="list-style-type: none"> <li>• WHO             <ul style="list-style-type: none"> <li>-Pre-approval process</li> <li>-Approved treatment guidelines</li> <li>-Essential Drugs List</li> </ul> </li> <li>• Ministries of Health             <ul style="list-style-type: none"> <li>-National Health and Drug Policies</li> </ul> </li> <li>• Global Fund</li> <li>• NGOs             <ul style="list-style-type: none"> <li>-NGO partner protocols (if inconsistent with WHO)</li> </ul> </li> <li>• President's Malaria Initiative</li> <li>• PEPFAR</li> </ul>
<p><b>Users that prioritize this element:</b>  <b>Overall importance: 4.4</b></p> <ul style="list-style-type: none"> <li>• # 2 priority information element overall; more important to suppliers than to buyers, and to short term forecasts than long term forecasts</li> <li>• Suppliers             <ul style="list-style-type: none"> <li>-Strategic Global Demand Forecasts</li> <li>-Sales Forecasts</li> </ul> </li> <li>• Buyers (International Procurement agents/National program implementers and distributors):             <ul style="list-style-type: none"> <li>-Strategic forecasts*</li> <li>-Procurement plans</li> </ul> </li> </ul>	
<p><b>Gaps identified:</b>  <b>Overall Performance: 3.6</b></p> <ul style="list-style-type: none"> <li>• <b>Availability</b> <ul style="list-style-type: none"> <li>-National treatment guidelines and/or program protocols do not always exist</li> <li>-Distinct national guidelines, protocols and processes by country makes it difficult to know which product is registered where, find the status of regulatory approval for registered products, and understand associated regulatory requirements (e.g. OTC vs. prescription) and other guidelines (e.g. acceptable sources of emergency resupply) across various countries. Compiling this data is often a time-intensive manual process</li> </ul> </li> </ul>	

Source: Working Group and Expert interviews; Working Group Survey on Information Needs and Gaps  
 \* Note: Buyer strategic demand forecasts were not represented in survey responses

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## Donor Funding Data: Profile and Gaps

<p><b>Description:</b> Historical and projected international donor funding for product categories, including by country and program. Timing of funding availability and funding constraints:</p> <ul style="list-style-type: none"> <li>• Funding by product category by country by program (for relevant time horizon)</li> <li>• Expected date of disbursement for all funding (more crucial in the short term)</li> <li>• Consolidated data across all funders per country</li> </ul>	<p><b>Key Sources of Data:</b></p> <ul style="list-style-type: none"> <li>• Global Fund</li> <li>• World Bank</li> <li>• WHO</li> <li>• GAVI</li> <li>• USAID</li> <li>• Other bilateral donors</li> <li>• Nat'l governments</li> <li>• PEPFAR</li> <li>• President's Malaria Initiative</li> <li>• DAC</li> <li>• UNAIDS</li> </ul>
<p><b>Users that prioritize this element:</b> <b>Overall importance: 4.2</b></p> <ul style="list-style-type: none"> <li>• # 3 priority information element overall; more important to suppliers than buyers, and to long term forecasts than short term forecasts</li> <li>• Suppliers             <ul style="list-style-type: none"> <li>-Strategic Global Demand Forecasts</li> </ul> </li> <li>• Buyers (International procurement agents/Nat'l program implementers/distributors):             <ul style="list-style-type: none"> <li>-Strategic forecasts*</li> <li>-Procurement plans</li> </ul> </li> </ul>	
<p><b>Gaps identified:</b> <b>Overall performance: 3.1</b></p> <ul style="list-style-type: none"> <li>• <b>Availability</b> <ul style="list-style-type: none"> <li>- Suppliers have little access to funding forecasts for a particular product (at country or program level)</li> <li>- Multiple sources of funding exist per disease, but no consolidated view of funding available</li> <li>- Timeframes of future funding commitments are often too short (1-2 yrs, where 5 yrs is required)</li> <li>- Lack of transparency of country procurement, financing &amp; funds flow (e.g. unclear where \$ sits in country)</li> </ul> </li> <li>• <b>Quality</b> <ul style="list-style-type: none"> <li>- Future funding projections are not credible until resources are committed. New donors, rapidly growing/evolving funding streams compound uncertainty and credibility gaps</li> <li>- Lack of data standards across multiple funders to enable consistent data comparison/collation (distinct funding cycles, disbursement rates &amp; procurement mechanisms by funder make information difficult to capture consistently)</li> <li>- Uncertainty between timing of fund approval, disbursement and expenditure</li> </ul> </li> </ul>	

Source: Working Group and Expert interviews; Working Group Survey on Information Needs and Gaps  
\* Note: Buyer strategic demand forecasts were not represented in survey responses

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## Historical Consumption Data: Profile and Gaps

<p><b>Description:</b> Historical market sales data by product, including by country and program over the relevant time horizon (for existing/analog products)</p>	<p><b>Key Sources of Data:</b></p> <ul style="list-style-type: none"> <li>• WHO (AMDS, GDF, MMSS)</li> <li>• National buyers/program implementers (including MOH)</li> <li>• Individual manufacturers</li> <li>• Global Fund</li> <li>• UNICEF</li> <li>• GAVI</li> <li>• Axios</li> <li>• UNFPA</li> <li>• IAPSO</li> <li>• Crown Agents</li> <li>• IDA</li> <li>• Surveys of local facilities</li> <li>• Social marketers</li> </ul>
<p><b>Users that prioritize this element:</b> <b>Overall importance: 4.2</b></p> <ul style="list-style-type: none"> <li>• # 3 priority information element overall; more important to suppliers than to buyers, and to short term forecasts than long term forecasts</li> <li>• Suppliers             <ul style="list-style-type: none"> <li>-Strategic Global Demand Forecasts</li> </ul> </li> <li>• Buyers (International Procurement agents/National program implementers and distributors):             <ul style="list-style-type: none"> <li>-Strategic forecasts*</li> <li>-Procurement plans</li> </ul> </li> </ul>	
<p><b>Gaps Identified Overall Performance: 3.0</b></p> <ul style="list-style-type: none"> <li>• <b>Availability:</b> <ul style="list-style-type: none"> <li>-No consolidated view of historical sales is available by product in much of the developing world</li> <li>-Data sources set up to collect data centrally only capture a very small share of the market (e.g. Global Price Reporting Mechanism is only currently tracking ~10% of purchases)</li> <li>-Share of public and private markets unclear</li> </ul> </li> <li>• <b>Quality:</b> <ul style="list-style-type: none"> <li>-Available data is often perceived as lacking in credibility due to lack of sufficient accountability and quality systems to validate information</li> </ul> </li> </ul>	

Source: Working Group and Expert interviews; Working Group Survey on Information Needs and Gaps  
\* Note: Buyer strategic demand forecasts were not represented in survey responses

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## Country Health Infrastructure Data: Profile and Gaps

<p><b>Description:</b> Health infrastructure data, including:</p> <ul style="list-style-type: none"> <li>• # of clinics, pharmacies, labs and hospitals</li> <li>• # of disease-appropriate practitioners in area (doctors, nurses, trained mothers, lab technicians, etc).</li> <li>• Estimated knowledge level of practitioners</li> <li>• Distribution of market between public and private providers</li> </ul>	<p><b>Key Sources of Data:</b></p> <ul style="list-style-type: none"> <li>• National Government (MOH)</li> <li>• WHO             <ul style="list-style-type: none"> <li>-Service Availability Mapping (SAM)</li> </ul> </li> <li>• USAID             <ul style="list-style-type: none"> <li>-Service Provision Assessment (SPA)</li> </ul> </li> <li>• Crown Agents</li> <li>• Other research/surveys             <ul style="list-style-type: none"> <li>-Customized research</li> <li>-GDF surveys</li> <li>-Facility surveys</li> <li>-Other assessments (e.g. readiness assessments, logistics system assessments, etc)</li> </ul> </li> </ul>
<p><b>Users that prioritize this element:</b>  <b>Overall importance: 4.2</b></p> <ul style="list-style-type: none"> <li>• # 3 priority information element overall; important to both suppliers and buyers, more important to short term than long term forecasts</li> <li>• Suppliers             <ul style="list-style-type: none"> <li>-Strategic Global Demand Forecasts</li> <li>-Sales forecasts</li> </ul> </li> <li>• Buyers (Internat'l Procurement agents/Nat'l program implementers/distributors):             <ul style="list-style-type: none"> <li>-Strategic forecasts*</li> <li>-Procurement plans</li> </ul> </li> </ul>	
<p><b>Gaps Identified:</b>  <b>Overall Performance: 3.1</b></p> <ul style="list-style-type: none"> <li>• <b>Availability and Quality:</b> <ul style="list-style-type: none"> <li>- According to WHO, of 192 WHO member countries, only 39 have sufficient health infrastructure information (92 have only census data, old survey data, or no data at all)</li> </ul> </li> </ul>	

Source: Working Group and Expert interviews; Working Group Survey on Information Needs and Gaps  
 \* Note: Buyer strategic demand forecasts were not represented in survey responses

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## Supply Chain/Logistics Data: Profile and Gaps

<p><b>Description:</b> Data on supply status and delivery times for particular product types, including:</p> <ul style="list-style-type: none"> <li>• Current product inventory levels</li> <li>• Time/location of product receipt</li> <li>• Lead times</li> </ul>	<p><b>Key Sources of Data:</b></p> <ul style="list-style-type: none"> <li>• National government (MOH)</li> <li>• UNICEF</li> <li>• WHO</li> <li>• NGOs/FBOs             <ul style="list-style-type: none"> <li>-If managing a supply chain and logistics management information system</li> </ul> </li> <li>• JSI             <ul style="list-style-type: none"> <li>-Logistics Management Information System (LMIS)</li> </ul> </li> <li>• Bespoke research</li> <li>• GDF research</li> </ul>
<p><b>Users that prioritize this element:</b>  <b>Overall importance: 4.1</b></p> <ul style="list-style-type: none"> <li>• # 4 priority information element overall; more important to buyers than suppliers, and to short term than long term forecasts</li> <li>• Suppliers             <ul style="list-style-type: none"> <li>-Sales Forecasts</li> </ul> </li> <li>• Buyers (International Procurement agents/National program implementers and distributors):             <ul style="list-style-type: none"> <li>-Strategic forecasts*</li> <li>-Procurement plans</li> </ul> </li> </ul>	
<p><b>Gaps Identified:</b>  <b>Overall performance: 3.1</b></p> <ul style="list-style-type: none"> <li>• <b>Availability:</b> <ul style="list-style-type: none"> <li>- Supply chain/logistics data such as inventory quantity and location is often unavailable as systems are not in place to manage the supply chain. This necessitates collecting anecdotal data, conducting labor-intensive site visits, and compiling national inventory reviews.</li> </ul> </li> <li>• <b>Quality:</b> <ul style="list-style-type: none"> <li>-Records often kept manually at the facility level, making them difficult to compile and analyze</li> <li>-At lower levels in the supply chain, there is a lack of accurate data around stock levels and consumption rates</li> </ul> </li> </ul>	

Source: Working Group and Expert interviews; Working Group Survey on Information Needs and Gaps  
 \* Note: Buyer strategic demand forecasts were not represented in survey responses

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## Demographic Data: Profile and Gaps

<p><b>Description:</b> Demographic data by country, including target population characteristics such as age, sex, birth rates, mortality and income</p>	<p><b>Key Sources of Data:</b></p> <ul style="list-style-type: none"> <li>• WHO</li> <li>• UN Population Division</li> <li>• World Bank</li> <li>• USAID             <ul style="list-style-type: none"> <li>-DHS survey</li> </ul> </li> <li>• National government             <ul style="list-style-type: none"> <li>-National census data</li> </ul> </li> <li>• US Census Bureau</li> <li>• UNAIDS</li> <li>• UN Statistics Division</li> </ul>
<p><b>Users that prioritize this element:</b>  <b>Overall importance: 4.0</b></p> <ul style="list-style-type: none"> <li>• # 5 priority information element overall; more important to buyers than to suppliers, and to long term forecasts than short term forecasts</li> <li>• Suppliers             <ul style="list-style-type: none"> <li>-Strategic Global Demand Forecasts</li> </ul> </li> <li>• Buyers (International Procurement agents/National program implementers and distributors):             <ul style="list-style-type: none"> <li>-Strategic forecasts*</li> <li>-Procurement plans</li> </ul> </li> </ul>	
<p><b>Gaps Identified:</b>  <b>Overall performance: 3.9</b></p> <ul style="list-style-type: none"> <li>• <i>Quality:</i> <ul style="list-style-type: none"> <li>- Lack of agreement on a single source of data across public sector organizations in the developing world</li> <li>-Discrepancies exist in basic demographic data across sources (e.g. World Bank vs. UN)</li> </ul> </li> </ul>	

Source: Working Group and Expert interviews; Working Group Survey on Information Needs and Gaps  
 \* Note: Buyer strategic demand forecasts were not represented in survey responses

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## Product Profile Data: Profile and Gaps

<p><b>Description:</b> Information on key product characteristics for existing or future products, including (one or more of the following, as relevant and available):</p> <ul style="list-style-type: none"> <li>• Product formulation/specifications, e.g. efficacy, shelf life, storage/handling requirements</li> <li>• Regulatory status</li> <li>• Product price</li> </ul>	<p><b>Key Sources of Data:</b></p> <ul style="list-style-type: none"> <li>• Individual manufacturers</li> <li>• WHO</li> <li>• National government (MOH)</li> <li>• UNICEF</li> <li>• IAPSO</li> <li>• IDA</li> <li>• Crown Agents</li> <li>• Regulatory Authorities</li> </ul>
<p><b>Users that prioritize this element:</b>  <b>Overall importance: 4.0</b></p> <ul style="list-style-type: none"> <li>• # 5 priority information element overall; more important to suppliers than to buyers, and to short term forecasts than long term forecasts</li> <li>• Suppliers             <ul style="list-style-type: none"> <li>-Strategic Global Demand Forecasts</li> <li>-Sales Forecasts</li> </ul> </li> <li>• Buyers (International Procurement agents/National program implementers and distributors):             <ul style="list-style-type: none"> <li>-Strategic forecasts*</li> <li>-Procurement plans</li> </ul> </li> </ul>	
<p><b>Gaps identified Overall performance: 3.3</b></p> <ul style="list-style-type: none"> <li>• <i>Availability</i> <ul style="list-style-type: none"> <li>-Suppliers and buyers can be unwilling to unilaterally provide product profile data, particularly pricing information</li> <li>-Systems to collect buyer data (such as Global Fund's price reporting mechanism) are not sufficiently used</li> <li>-For new products, data may be not yet known</li> </ul> </li> </ul>	

Source: Working Group and Expert interviews; Working Group Survey on Information Needs and Gaps  
 \* Note: Buyer strategic demand forecasts were not represented in survey responses

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## Annex 4: Developed World Information Providers

### Profile of IMS Health:

<p><b>Type of information provided</b></p>	<ul style="list-style-type: none"> <li>• <b>Primary market and consumption data</b></li> <li>• <b>Market analysis</b></li> <li>• <b>Forecasting</b></li> <li>• <b>Consulting services</b></li> </ul>
<p><b>Type of entity</b></p>	<ul style="list-style-type: none"> <li>• <b>Private company</b></li> <li>• <b>Focused exclusively on the pharmaceutical sector</b></li> </ul>
<p><b>Data sources and collection</b></p>	<ul style="list-style-type: none"> <li>• <b>Payment of external sources (via monetary payment or data/systems resources) for access to their raw data</b> <ul style="list-style-type: none"> <li>– Collected from drug manufacturers, wholesalers, retailers, pharmacies, mail-order, long-term care facilities, and hospitals across 100 countries, 29,000 sources, and 225,000 sites</li> </ul> </li> <li>• Conducts <b>primary research</b> such as interviews</li> <li>• Possesses <b>deep in-house expertise</b></li> </ul>
<p><b>Data users and dissemination</b></p>	<ul style="list-style-type: none"> <li>• <b>Standard reports, market analyses, forecasts, and customized services are purchased by:</b> <ul style="list-style-type: none"> <li>– Pharmaceutical and biotech companies</li> <li>– Professional service firms and financial analysts</li> <li>– Government and other policymakers</li> <li>– Researchers and educators</li> </ul> </li> </ul>
<p><b>Quality and credibility assurances</b></p>	<ul style="list-style-type: none"> <li>• IMS Health is credible because: <ul style="list-style-type: none"> <li>– Its <b>reputation has been established over time</b></li> <li>– It is an <b>independent</b> entity</li> <li>– It has a sufficiently <b>large global footprint</b></li> </ul> </li> <li>• IMS Health data quality is assured: <ul style="list-style-type: none"> <li>– By circulating data back to manufacturers for <b>data validation</b></li> <li>– Because <b>quality is critical to its reputation and revenue</b></li> </ul> </li> </ul>

Source: Industry research

## Profile of Datamonitor:

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### Type of information provided

- **Market analysis**
  - **Forecasting**
  - **Consulting services**
- 

### Type of entity

- **Private** company
  - **Conducts market research across wide range of industries**
- 

### Data sources and collection

- **Payment of external sources for data**
  - Conducts **primary research** such as interviews
  - Possesses **proprietary databases and deep in-house expertise**
- 

### Data users and dissemination

- **Market analyses, forecasts/forecasting models, and customized services are purchased by:**
    - Pharmaceutical and biotech companies
    - Professional service firms and financial analysts
    - Government and other policymakers
    - Researchers and educators
- 

### Quality and credibility assurances

- Datamonitor is credible because:
    - Its **reputation has been established over time**
    - It is an **independent** entity
    - It possesses **specialist expertise in each industry sector**
  - Datamonitor data quality is assured:
    - Because **quality is critical to its reputation and revenue**
- 

Source: Industry research

## Annex 5: Online Inventory of Information Resources for Global Health Demand Forecasting

### ONLINE INVENTORY OF INFORMATION RESOURCES FOR GLOBAL HEALTH DEMAND FORECASTING

A great deal of the uncertainty in the market for global health products can be attributed to imperfect and asymmetrical information. There are a range of functions that could address the different types of information gaps: 1) facilitating access to existing, regularly collected data that is not shared; 2) setting common standards for available data to better meet user needs; 3) gathering and analyzing new data; and 4) forecasting demand itself through expert analysis of existing and new information.

Collaborative web-based technologies have the potential to facilitate these different functions to varying degrees. However, to the extent that the first stage in the information-management process relies first and foremost on a shared understanding of the current information landscape it would make sense to focus initial efforts on the creation of an online inventory of existing information sources. Such an inventory would consist of a “library” of the wide array of different indicators used as inputs to demand forecasts, organized by broad categories of information types,<sup>8</sup> where each indicator has its own webpage with:

- ◆ A detailed description of what it is, how it is calculated and which primary data sources it relies on<sup>9</sup>
- ◆ The level of country coverage and periodicity<sup>10</sup>
- ◆ Common variants<sup>11</sup>
- ◆ An assessment of the objectivity and accuracy of the data<sup>12</sup>
- ◆ An overview of the types of forecasts it can inform (e.g. supply-chain vs. strategic forecasts), who uses the data (e.g. suppliers, donors, etc.) and the information need it fills (ex: DTP3 coverage as a proxy of health system strength)<sup>13</sup>
- ◆ Examples of specific applications from existing forecasting efforts<sup>14</sup>
- ◆ A rating of the overall importance to forecasting<sup>15</sup>
- ◆ A discussion of key information gaps and concerns<sup>16</sup>
- ◆ Instructions on how to obtain the dataset<sup>17</sup>

By effectively increasing information transparency, such an inventory would have both short- and long-term benefits by lowering the information barriers for current forecasting efforts and improving communication across different stakeholders, as well as to inform possible long-term forecasting solutions by identifying the existing information gaps that would benefit most from the collection and analysis of new data (essentially expanding on the Dalberg survey findings in greater depth as well as facilitating wider input).

An online inventory could benefit from many of the advantages of collaborative technologies while minimizing the risks. Specifically, it could be initially populated by a dedicated staff researcher, so while it would benefit greatly from outside contributors its value would not depend on them entirely. Under this model, it should also be easy to encourage widespread input by requiring users to contribute to the dataset by completing a survey as part of an initial user registration process, which could automatically

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<sup>8</sup> See Dalberg survey categories and subsets of data categories.

<sup>9</sup> Objective data category input by CGD staff and locked for editing

<sup>10</sup> Objective data category input by CGD staff and locked for editing

<sup>11</sup> Subjective field for user comment via wiki discussion

<sup>12</sup> Subjective field for user comment via wiki discussion

<sup>13</sup> Subjective field for user comment via wiki discussion and/or via targeted user registration survey

<sup>14</sup> Subjective field for user comment via wiki discussion, perhaps on an entirely separate tab

<sup>15</sup> Automated field reflecting feedback from user registration surveys. Note that rating an indicators' usefulness might implicitly favor certain forecasting methods over others that are less widely used, although this could also be said of the choice of higher-level categories.

<sup>16</sup> Subjective field for user comment via wiki discussion

<sup>17</sup> Objective data category input by CGD staff; could consider having moderated user input

populate certain fields within the inventory. Users could also contribute in an ongoing fashion through wiki commentaries in other sections.

This tool should be piloted by CGD under the auspices of the Global Health Forecasting Working Group and in collaboration with Forum One Communications.<sup>18</sup> Over the long-term, however, it should be either a) integrated into a third-party information research firm<sup>19</sup> focused on demand forecasting for global health products – a potential solution currently being explored through a Request for Information – or b) maintained by CGD but expanded to encompass a much wider array of information and data categories used to inform global health policies as part of a broader GHPRN online presence. While this does not need to be decided upfront, the architecture should be designed with these options in mind from the outset.

Given that the outputs of the information inventory (as envisioned here) do not directly affect the broader recommendations of the Working Group as well as the fact that achieving a broad user/contributor base would require an extensive outreach effort, it may make sense to launch the final product in tandem with the final Working Group report, tentatively planned for May 2007. However, a beta version of the product should be available by December 2006 for a targeted roll-out during the Working Group's consultation phase (or even by the November Working Group meeting if possible) which would help to inform the development product, engage external stakeholders early on, populate the website, and serve as an interim product to maintain the Working Group's momentum.<sup>20</sup>

This project would entail several immediate next steps:

- The Forecasting Project Team should collectively identify a base set of indicators to include and the key characteristics and information to include about each indicator
- The Project Team should write up detailed plans for Working Group review
- Working closely with the rest of the Project Team, Dave Witzel should create a mock-up and site map for a short presentation at the September Working Group meeting (if possible)
- CGD should identify or hire staff to oversee the product development, research the various data categories, and populate the initial information (September-November) and to manage the inventory once it goes live

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<sup>18</sup> The tool could be developed and managed internally by CGD program staff or by a dedicated part-time intern

<sup>19</sup> A market research firm itself could choose to extend the use of collaborative technologies to inform its own work, for example by setting up a wiki or predictive market to help gather, validate or analyze new data inputs or even final forecasts. However, these strategies fall outside the scope of the Working Group's current efforts.

<sup>20</sup> Data entry could be centralized through the report launch, but should be largely automated afterwards

## Annex 6: Third Party Information Provider - Request for Information

### REQUEST FOR INFORMATION

#### Information Services to Support Forecasting Demand for Global Health Products

#### 1. Request for Information (RFI) Overview

The Forecasting Working Group, under the auspices of the Centre for Global Development (CGD)<sup>21</sup> seeks to identify potential approaches and partners to assist in improving the availability of information required for forecasting demand for health products in the developing world. The Working Group, which is charged with developing recommendations for possible implementation by international agencies and funders of global health activities, would like to evaluate the potential of creating an affordable and easily accessible information repository, clearinghouse, or service that could be used to support forecasting activities.

Specifically, the Working Group is requesting information from those organizations with significant experience in collecting, analyzing, and providing data on demand forecasting for health products to suppliers, purchasers, and governments. The information gained from this RFI process will be used to provide technical, organizational, and financing recommendations to policy makers and funders in the global health community for actions that could be taken to create a sustainable information base for demand forecasting.

While noting that this RFI is not a formal request for proposal, it will lead to specific recommendations to funders and policy makers that could result in the issuance of formal, commercial RFPs. The information provided by responders will be extremely valuable in informing these future processes.

This RFI covers three areas to which interested organizations could respond in supporting demand forecasting in the developing world. Responding organizations **are not required** to address all of these areas but can select those best suited to their expertise and interests.

**1. Information Collection & Analysis:** Approaches to gathering existing data on factors affecting demand, synthesizing and analyzing these data into useable information, and sharing it with relevant players (e.g. suppliers, technical organizations such as WHO, funders such as the World Bank, the Global Fund to Fight AIDS, TB and Malaria, the Gates Foundation, and product development partnerships such as the Medicines for Malaria venture).

**2. Market Research and Intelligence:** Approaches to gathering new and existing information, such as market research on uptake rates for new therapies, price sensitivities in donor and privately funded markets for specific health interventions, and consumption data.

**3. Forecasting Consultation and Training:** Approaches to providing consultation and training to developing country governments, international technical agencies, and others on demand forecasting for health products.

The information provided by responding organizations will be considered non-binding and confidential for all parties. Please respond by September 30, 2006 to Jessica Pickett at [jpickett@cgdev.org](mailto:jpickett@cgdev.org).

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<sup>21</sup> For more information see [www.cgdev.org/forecasting](http://www.cgdev.org/forecasting). Please note that CGD will not be responsible for implementing the recommendations that come out of the Working Group process.