TRACK C SUMMARY — BEHAVIORAL SCIENCE, PUBLIC HEALTH, AND THE MICROBICIDE MARKET

BY
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My responsibility here today is to summarize those parts of the Conference program that fall into the category sometimes referred to as "Pharmaco-economics" but best thought of more broadly as "The Economics of Microbicide Development." This subject comprises two primary components:

- **market potential**, or the extent to which there will be a public and/or private market for microbicides once they are proved feasible in clinical trials, and
- **public health potential**, which refers to the impact such products might have on the health of the populations who use them.

Each of these components depends on factors that do not simply interact but are truly inseparable. Those are:

- the **characteristics** of a given microbicide product,
- its **availability**, and
- the willingness of consumers to value and/or enjoy it sufficiently to **use** it consistently and correctly (sometimes referred to as "product acceptability").

This summary is based on the **presentations by**:

- Arnan Mishkin ("Potential market for microbicides")
- Bethany Young Holt ("Market potential for microbicides: young US women"/Abstract C-284)
- Sanjay Garg ("Survey of marketed vaginal formulations in India"/Abstract C-076)
- Elizabeth McGrory ("Preparing for microbicide access and use: policy priorities"/P-317)
- Lori Heise ("Microbicides, HIV vaccines and treatment access: comparing the advocacy challenges"/Abstract C-333)
- and the four presentations by the London School of Hygiene and Tropical Medicine, led by the Keynote presentation of Charlotte Watts ("New hope for HIV prevention: projections of the impact of microbicides"/Abstract C-319).

Before proceeding further, one important caveat merits observation. There is, in some quarters, resistance to the concept of "a microbicide market" with its implications that some kind of profit will be involved. This derives from the view that microbicides should be developed for "user populations" in lower-income countries with either established or emerging HIV/AIDS epidemics that present substantial risk for those populations. In such contexts, microbicides would be made available either *gratis* or at very low cost, with both procurement and distribution highly subsidized by public-sector and/or philanthropic sources.

This view is fully appropriate. However, it is incomplete for several reasons:

1) It leaves aside the **contribution that could be made by large pharmaceutical companies** to microbicide research and development in all its phases and, later, large-scale manufacture, marketing, and distribution of licensed products—a contribution that will, increasingly, not only be desirable but may prove to be essential. So far, as we all know, participation in the microbicide field by what is typically referred to as "Big Pharma" has ranged from non-existent to miniscule.

2) **Some consumers can and will pay** for microbicides distributed through social-marketing or private market channels, so to pretend that no one will ever make a profit from microbicides is unrealistic and impractical.

3) An unknown number of microbicides will be formulated not only for protection against HIV but against other sexually transmitted infections as well. Some will also be contraceptive. Each of these **product profiles will have different support requirements** with respect to public-sector disposition to subsidize and the corresponding need to depend on private markets, as well as different consumer targets with different willingness and ability to pay.

4) A purely public-sector market for microbicides necessarily raises questions of **sustainability** with respect to donor and host-country disposition and ability to keep paying for those commodities.

(Now that I understand from Lut Van Damme that it was not necessary to write up my Track Summary in narrative form, I am from this point forward simply providing the notes for my presentation. If you wish me to complete the narrative, please let me know as soon as possible.)

- **Q. Is There a Market for Microbicides?**
  A. Yes.

There will be "generations" of microbicides (refer to web site—www.rockfound.org—for report of Pharmacoeconomics Working Group of the Rockefeller Microbicide Initiative), as research and development proceed and mature. (See Table on next page)

Dimension	**1st Generation**	**2nd Generation**	**3rd Generation**
When	2007 +5 years	2012 +5 years	2017
Number of products	1	3 (2 vaginal, 1 rectal)	multiple
Formulations	?	+ rectal	controlled-release vaginal devices
Indications	HIV +1 other STI possibly contraceptive	herpes gonorrhea chlamydia HPV choice of contraceptive or non-contraceptive version	herpes gonorrhea chlamydia HPV choice of contraceptive or non-contraceptive version
Microbicidal effectiveness **-Typical use** **-Consistent/correct use**	 50% 60%	 70% 90%	 85% 90% (user-applied) 97% (device-driven)
Contraceptive effectiveness **-Typical use** **-Consistent/correct use**	 75% 85%	 80% 90%	 90% 97%
Use instructions	approved for use with a condom or vaginal device	approved for use with a condom or vaginal device	approved for use with a condom or vaginal device
Sales channel **-Industrialized country** **-Developing country**	 prescription-only over-the-counter (OTC)	 OTC OTC/social marketing	 OTC OTC/social marketing
Price (average) **-Industrialized country** **-Developing country**	 $3 for single-pack $1.50/dose multi-pack $0.83/dose single-pack $0.35/dose multi-pack	 $2 for single-pack $1.25/dose multi-pack $0.75/dose single-pack $0.32/dose multi-pack	 $1 for single-pack $1.25/dose multi-pack $0.67/dose single-pack $0.28/dose multi-pack
Global market (US$) **-Expected-case scenario**	 Contraceptive: $950M Non-contracept.: $900M	$1.5 billion	$1.8 billion
-Bigger market scenario: **Regular hygiene use**	Unlikely	$3.0 billion	$5.0 billion
-Smaller market scenario: **Niche product**	$20 million	$50 million	$100 million

- **Q. Is there a market in the United States at different socioeconomic levels?**
- **A. Yes.**

Between 58% and 68% of college women would buy a microbicide (average 63%).

Importance of attributes:	**Not important (N) or undesirable (U):**
Spectrum	36% (HIV only N)
Duration of Activity	19% (2 hours U)
Efficacy	18% (less protection than condoms U)
Method of Distribution (OTC/Rx)	9% (Rx U)
Application Type	9% (finger U)
Volume	7% (N/some leakage ok)

- **Q. Is there a market in developing countries?**
- **A. Yes.**

The example of vaginal products in India (which has the world's largest middle class [PH], which already constitute a substantial market.
Vaginal dosage forms (VDF) in India include tablets, creams, solutions, gels, ointments, douches, capsules, pre-filled applicators, and suppositories. The most popular and widely used vaginal dosage form (VDF) in India is the tablet, of which there are 29 brands, available in various colors, sizes, and shapes. VDF are used for the following indications and applications:
-antifungal/bacterial
-disinfectant
-estrogen/progesterone
-contraception/natural products

- **Q. Do microbicides promise significant public health potential?**
- **A. Yes.**

Mathematical epidemiological modeling and economic analysis was used to estimate the potential public health impact of the introduction of an effective microbicide in 73 lower-income (GDP <$1,200/yr.) countries and all Sub-Saharan African countries (see Abstract C-319, p. 68, for detailed table underpinning the following text), and generated the following conclusions:
-A microbicide of 60% efficacy with 20% service coverage would:
—Avert 2.5 million new infections (Remember: there were 5 million new HIV infections globally in 2001)
—Could lead to $2.7 billion in direct cost savings to health systems, plus
—$1.0 billion productivity savings from decreased absenteeism and retraining/replacing workers.
Potential impact will be substantial in countries both with established and emerging HIV epidemics.

- **Q. Are these models predictive when applied to "real" settings?**
- **A. Yes, but…**

-Tested in Cotonu, Benin, and Johannesburg, South Africa
-In both sites, substantial impact, but dependent on HIV and STD efficacy and risk, with more impact on groups where risk low.
-The ability to do such real-life modeling in national settings will be critical for national drug regulatory authorities (NDRA) that wish to do cost/benefit assessment as a basis for making decisions on microbicide product licensing.

- **Q. Do we need to worry about "condom migration"?**
- **A. Yes and no, depending on local circumstances.**

-For a microbicide effective against both HIV and other STDs, the amount of condom migration that will be tolerable will depend on the levels of the following variables:
—efficacy – higher (50% or higher)
—present consistency of condom use — lower.
Under most circumstances, if moderate levels of use can be achieved, potential for increased risk due to condom migration will be outweighed by the benefits of microbicide use.

- **Q. There has been growing attention to questions of access to microbicides once one is actually produced. Why are we worrying about this now?**
- **A. Because it is not only smart but some aspects of access are critical right now.**

- **Q. What are the elements of access that are most critical?**
- **A. They are the following:**
  -acceptability and use
  -supportive environment
  -availability
  -affordability
  -regulatory approval and licensing.

- **Q. What are the elements of access that should be priorities right now?**
- **A. Those are the following:**
  -policy research in key countries to establish a "framework for microbicide preparedness"
  -establish international working group with representatives from both the public and private sectors, to specify policy, legal, fiscal and monetary measures to ensure access
  -accelerate international efforts to outline regulatory processes and requirements
  -step up efforts to raise profile of microbicides on "global stage"
  -strategically expand "community", draw in new expertise

- **Q. How will microbicides be made available?**
- **A. There will be two basic distribution paradigms:**

-public health system channels, which will ideally emphasize access and equity, in some way subsidized, focused on serving low-income/high prevalence populations

-private market channels, typically characterized by efficiency and assumed sustainability, focused on serving middle-income/probably low-HIV prevalence/possibly high-STD prevalence populations.
Each has limitations, each has strengths, so that planning for the future of microbicides must contemplate and plan for both of these critical channels of access.

CLOSING REMARKS:

The topic was "the economics of microbicide development," and so I will close with some numbers and their implications for what we must do next:

To develop the existing pipeline of potential microbicide products to guarantee a high likelihood of generating several safe, effective microbicides by 2010, the price tag calculated by the Pharmaco-Economics Working Group of the Rockefeller Initiative would be **approximately $775 million in direct product development costs over the next 5 years**.

While it is hard to calculate because of multi-year granting strategies, **current public-sector and philanthropic funding commitments through 2003 total—very roughly--$259 million**. Thus, we anticipate a substantial shortfall in financial resources for microbicide research and development.

This means that in order to reach the "consumer market"—

- that body of potential users that we have been told is very large
- upon whom, we were also told today, microbicides could confer such large—perhaps life-saving—impact,
- we will need:
  - **more financial resources**
  - **more public education and advocacy** to mobilize those resources
  - **economies of both scale and scope**, requiring in turn:
    - **better portfolio management** through better selection of candidates for advancement to each successive developmental phase of the pipeline
    - **coordination** to save resources in key areas (e.g., common placebo, formulation, head-to-head testing, manufacturing economies), or avoiding duplicate investment and effort
    - **collaboration with HIV vaccine developers** to determine areas where joint efforts could produce economies for both fields of effort (for example, joint work on developing international regulatory consensus, share DSMB's [Data Safety and Monitoring Boards], building common clinical site capacity).

That, dear colleagues, is our economics of microbicide development "homework" if this technology is to achieve, in reasonable time, the alleviation of the misery about which we are so deeply concerned here today.

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