Testimony: Gregory N. Connolly DMD, MPH Professor of Research Northeastern University, School of Law and The Bouve School of Health Sciences

To: The Food and Drug Administration's Tobacco Product Scientific Advisory Committee

January 25, 2018

RE: Philip Morris S. A. Applications for Modified Risk Tobacco Product Authorizations (MRTP) for Three Brands of IQOS Platform 1, Tobacco Heating System (THS) 2:2

N.B. Testimony Applies to Pending Premarket Authorization for the Same Brands

----------Testimony----------

1.) **Content of my Testimony:** Philip Morris SA has filed three applications with the Food and Drug Administration Center for Tobacco Products market IQOS brands, platform 1, THS 2.2, as modified risk tobacco products and has also applied for the same IQOS Platform 1 THS 2.2 brands for pre-market tobacco product authorization (PMTCA) (1). My testimony will focus on the contribution of IQOS to population health.

2.) **Qualifications:** I have conducted extensive research on the design and characterization of tobacco products published in numerous scientific articles while as a professor at the Harvard School of Public Health from 2003-2014 and since 2014 at Northeastern University. Numerous studies have been published including menthol's effect on smoking initiation used by the Congress in constructing the FSPTCA. I served on the first TPSAC addressing menthol in cigarettes. Since that time my research has focused on the addiction potential of tobacco products as it relates to the public health impact (initiation, cessation, and effects on the non-smoker) the FSPTCA sets a standard of performance. Over the past two years, my

research has focused on the design characteristics and effects on public health impact of what the tobacco industry terms Next Generation Products (NGP), some of which are called Heat Not Burned (HNB). The flagship NGP is the IQOS brands that comprise four platforms TOPSAC is studying IQOS Platform 1 THS 2.2. Basis of our Testimony

3.) **Sources of our Testimony:**

i.) **A review of the MRTP PM SA application** submitted to the FDA posted with substantial redactions which, given the short time for preparation we were unable to file appeals with the FDA or DHHS FOIA offices for proper disclosure.

ii.) **A dissection and analysis of the design and characteristics of IQOS** Platform 1 done by our group and a computer consulting firm.

iii.) **PMI's scientific articles** and posters on its website WWW.PMI.SCIENCE

iv.) **Reviews of PMI and other NGP patents** to US and foreign patent offices for systems, microchips, and other elements identified in the dissection, These include patents for a "**SPLIT Air Flow Systems**" (WO 20150083148 A1), "**Biological Control in Electronic Cigarettes**" (WO 2016/199062 A1) "**Inhaling Device with User Recognition based on Initiation Behavior**"(WO2001658 A1), "**Aerosol-Generating system with Differential Heating Device**" (W) 201410320 A1), "An Aerosol Generating System having a controller for the Formation of Smoke Constituents" (EP 2471392 A1), "**A Flow Sensor System**" (W0 2010/003480 A1) "Aerosol Generating System with Consumption Monitoring and Feedback" (W) 2013/0098398 A2), etc. and non PM SA patens including that of Pax Labs for its JUUL product "**Vaporization Device System and Methods**" (US 9549573 B2

v.) Microchips and circuits used in IQOS as identified by a unique imprinted number for their description, functions and purposes posted on the Internet by Google.

vi.) Reports of Philip Morris International to Investors Consumer Analyst Group, New York (CAGNY) Conferences Tobacco (various dates).

vii.) Financial Analysts Reports on IQOS in part or whole including Wells Fargo Equity Research, Berenberg, Cowen Equity Research, Goldman Sachs Equity Research

viii.) Investigative Journalism Publications Including Reuters Report 4, December 21, 2017.

4.) **Authorization of IQOS as an MRTP and Section (b) (4) Benefit to the ....Population as a Whole (B) Effects on quitting (C) Effects on Initiation.** Under the Family Smoking and Tobacco Prevention Control Act (FSPTCA), FDA is required to refer any application for an MRTP to the FDA's Tobacco Product Scientific Committee (TPSAC) to issue report and recommendations to FDA under Section 911 on the MRTP authorization. Under the same Section 911, (L) (2) FDA is to seek consultation from the Institute of Medicine (IOM) for any regulations or guidance issued for MRTP applications with input of other appropriate scientific and medical experts, on the design and conduct of such studies and surveillance. Based on the FSPTCA such regulations or guidance shall be revised on a regular basis as new scientific evidence has become available. The IOM report was issued in 2002, had no members or experts with backgrounds on use of advanced computer sciences, informational technologies or informatics and their effects on addiction potential of MRTPS and how these technologies could be used to control, individualization and enhancement of MRTP addiction potential. Despite new science becoming available and used by the FDA in its recent approval of the drug Ambilfy that uses embedded sensors to monitor drug compliance FDA/CTP has not requested the IOM to update its report to address this new science and section 4 of the IOM report does not address these technologies and addiction potential because of their unavailability in 2001.

5.) **Preliminary Findings**

Philip Morris SA makes two claims for IQOS which should be addressed by TPSAC in its report and recommendations.

i.) The Reduced Risk Claim
"The THS aerosol has significant reductions in, or absence of toxicants when compared to cigarette smoke. For a (cigarette) smoker who switches to THS from cigarettes, this reduction in exposure to toxicants provides the foundation for the reduced harm (MRTP) rationale". (THS 2.7 Executive Summary)

ii.) Claim of Benefits to the Population as a Whole
"THS was developed to appeal to smokers. In order to facilitate complete switching from cigarettes. THS delivers tobacco flavors and nicotine satisfaction that are comparable to those of cigarettes and a ritual that initially is different but to which smokers can adapt in a few days."

iii.) We do not address claim one but argue that **claim two is unproven by the evidence submitted by PM SA,** and **if IQOS is authorized it will possibly allow the introduction of radically new highly advanced technologies into tobacco products thus setting dangerous precedents for other programs in FDA** that are faced with similar questions, questions which Congress has addressed for drugs and medical devices.

iv.) PM SA clearly states that IQOS will equal the nicotine satisfaction of the highly addictive cigarette. Yet, there is no consensus to date of the FDA or other scientific bodies if the regulatory strategy for harm reduction should be lowering the addiction potential of combusted tobacco products or to increase the addiction potential for PREPs. Until such a consensus is achieved possibly with input from the IOM IQOS should not be authorized based on evidence submitted by OPMSA on the extremely high rate of conversion (>70%) to IQOS in Japan.

v.) FDA has called for a standard to reduce addiction potential in cigarettes (NEJM 377:12 9/21/2017)" while still delivering satisfying

levels of nicotine for adults who still need or want it". Yet, no such standard has been put forth by FDA for combusted products. Until one has been and PM SA and other manufacturers agree to it (possibly reduce nicotine levels to a non- addictive level by 2025) approval of IQAOS is highly premature.

vi.) It strongly appears that IQOS delivers nicotine in a manner that is highly addictive by assuming control over the manner which nicotine is delivered. This is possibly done through the use of a dual airflow system where the users draw is sensed by a microchip, the data stored in a second chip, the data analyzed by another set of chips imbedded with an algorithm that produces a new program that is used by a microprocessor to affect the design features of IQOS including battery temperature instantaneously to possibly allow sub ohming and creation of aerosols of small enough size to be deposited into the lung for rapid uptake and based on Henningfield's research, control the level of unit dosing possibly reproducing a spike effect instantaneously, speed of delivery, sensory stimuli and schedule of reinforcement (puff interval) akin to that of a cigarette.

vii.) PMI and PM SA's publications and submission almost exclusively focus on reduced risk and fail to address addiction potential. These inferences were obtained by a rigorous review of dissection of IQOS, use of Henningfield's research on addiction potential, patents, and the Japanese data. These questions of addiction potential and IQOS should be thoroughly addressed by PM SA before any consideration is given to authorization.

viii.) In newer versions of IQOS in test market in Japan WiFi like capacity has been added that would further increase addiction potential. The WiFI would allow Smart Phone pairing or information to appear on a device display that allows connectivity to central computers where individual data could be stored and merged with mega data bases to further control, individualize and enhance nicotine dependence. IQOS P 1 THS2.2 is defined as a platform like a computer that provides users with multiple functions which are increased when

paired with a Smart phone or information displayed on a panel on the basic unit panel. In Japan and Switzerland IQOS 1 has been modified to WiFi like connectivity to central computers for individual data collection. This added function allows e commerce, social connectivity, tracking and data storage of user behavior, targeted advertising, couponing, and a host of other features in a virtual world of nicotine use that is questionable banned by the MSA, state law, unenforced sections of the FSPTCA or changes in social norms of American society.

ix.) Imbedded algorithms could deter quitting as the product possibly adjusts nicotine delivery to undermine efforts of users to end their nicotine other features of the product.

x.) Issues of Privacy and Protection of Data Collected on IQOS Users.

IQOS will collect highly detailed information on users PM SA provided only a three-page submission (appendix A3.1.3 Device Data Storage) on the storage of data collected from IQOS. of which virtually the entirety of the three pages are classified as B4. Even if disclosed it is extremely hard to believe that in three pages the data storage capabilities and policies should be assessed by FDA or TPSAC. The recent approval of the drug Amblify B which simply senses through an embedded sensor and transmitter if the patient is using the drug and The Health Care Law of 2016 clearly lays out Congressional concerns to protect patients and users from drugs and medical devices that employ cyber technologies. Nowhere is there a recognition of this law by PM SA or any attempt to respond to its provisions

xi.) Over the past 15 years per capita cigarette sales fell in large measure due to the accumulating science of its harm and addictiveness used to implement comprehensive tobacco control policies, programs, litigation and product regulation at the end of the 20th century. Since 2000, unit cigarettes sold have fallen 2.5% per year and is

accelerating. If the rate continues, the per capita rate of combusted cigarette consumption possibly could equal of 1920, three years after the introduction the first modern cigarette brand, by the 2030's, to 500 cigarettes per person per year, a rate likely insufficient to support its manufacturer and social base sufficient to support use. Conceivably, the cigarette could become the likes of lard in this century without IQOS.

xii.) Financial analysis suggests that IQOS will have a halo effect and renormalize cigarette smoking. After barbarization is considered of smokers switching to IQOS actually increase overall use. The same analysts report that the current rate of 2.5% decline in cigarette sales could be reduced from 2.5% to 1.5% if IQOS is authorized. One unanswered question which may never be, is the question of reducing harm by IQOS to future profitability of PM SA or harm to cigarette smokers. IF PM SA agreed to reduce nicotine levels to below non-addictive ones by 2025 an answer may exist.

xiii.) Finally, children and adolescents raised in the I PAD generation will be enharboured, attracted, and addicted to IQOS by the design, heavy use of high technologies, ease of use and high addiction potential. The high use of e cigarettes among adolescents in the US is of concern. The newly introduced brand JUUL whose patent strongly suggests it employs some of the basic principles of IQOS in enhancing and controlling addiction potential the principle of prevention long fostered by the FDA should be applied to the consideration of IQOS. Yet, the cigarette industry is rich in resources to protect its future investing over $3 billion into IQOS and over $8 billion since 2008 in PRRPs. More than ever science not profits should drive governmental decision making and I ask the TPSAC to do so.