

目 录

发刊词..... 冯友梅(1)

专题探讨

亚太公共卫生学术联盟与我国公共卫生教育的发展 王 波,李立明(2)

中国与全球卫生:理念与未来..... 任明辉,卢国萍(6)

全球视角下的卫生政策:为促进健康公平而努力 孟庆跃(9)

浅析我国与非洲南南卫生合作的转变 季 煦,卢国萍,赵莉娜(13)

Fostering China's Increasing Engagement in Global Health
..... Feng Cheng, Lucy Chen, David Gold, et al(19)

政策分析

中美两国烟草控制政策的比较研究..... 崔 丹,甘 甜,毛宗福,等(23)

Public Objections to Environmental Tobacco Smoke among Adults in Hawaii
..... Miaoxuan Zhang, Rebekah Rodericks, Stephanie Lee, et al(29)

实验研究

Effective Recovery of Infectious Human Enterovirus from Environmental Waters for Their Application
for Water Quality Monitoring Zi Wang, Si Sun, Christina Connel, et al(37)

研究综述

全球健康中的关键研究方法——实施性研究简介..... 顾 菁,郝元涛(46)

耐多药结核病国内外研究状况的文献分析研究..... 应朝宇,谭晓东,刘 贝,等(51)

意大利区域医疗绩效评估系统述评 黎 浩,刘庭芳,董四平(58)

The Role of Early Life Nutrition in Obesity Prevention Colin Binns, Mi Kyung Lee, Rongxian Xu(64)

Contents

Preface *Youmei Feng* (1)

Research on Special Topics/Subjects

APACPH and Public Health Education in China *Bo Wang, Liming Li* (2)

China and Global Health: Concept and Future *Minghui Ren, Guoping Lu* (6)

Global Health Policy; Efforts for Promoting Health Equity *Qingyue Meng* (9)

The Analysis of New Practices of Sino-African Health Cooperation *Xu Ji, Guoping Lu, Lina Zhao* (13)

Fostering China's Increasing Engagement in Global Health *Feng Cheng, Lucy Chen, David Gold, et al* (19)

Policy Analysis

Comparative Research on Tobacco Control Policy between USA and China
..... *Dan Cui, Tian Gan, Zongfu Mao, et al* (23)

Public Objections to Environmental Tobacco Smoke among Adults in Hawaii
..... *Miaoxuan Zhang, Rebekah Rodericks, Stephanie Lee, et al* (29)

Laboratory Research

Effective Recovery of Infectious Human Enterovirus from Environmental Waters for Their Application
for Water Quality Monitoring *Zi Wang, Si Sun, Christina Connel, et al* (37)

Research Review

Implementation Research: a Brief Introduction of a Key Research Framework in Global Health
..... *Jing Gu, Yuantao Hao* (46)

Bibliometric Analysis of Multidrug-resistant Tuberculosis Literature at Home and Abroad
..... *Chaoyu Ying, Xiaodong Tan, Bei Liu, et al* (51)

The Italian Regional Healthcare Performance Evaluation System: A Review and Commentary
..... *Hao Li, Tingfang Liu, Siping Dong* (58)

The Role of Early Life Nutrition in Obesity Prevention *Colin Binns, Mi Kyung Lee, Rongxian Xu* (64)

发 刊 词

带着广大学术同仁的殷切期待,经过两年多的筹备,由武汉大学全球健康研究中心主办的《全球健康学杂志》创刊号终于面世了。这是我国第一本专门致力于全球健康学研究的学术期刊,2014和2015年为试刊时间,接收中英文双语稿件(半年刊)。2016年开始,以接受英文稿件为主。力争到2016年后,将只刊发英文稿件,面向国际发行,并过渡到季刊。

二十一世纪,保障健康已经成为个人和社会都普遍接受的重要价值观念,也是全球各国和地区要共同承担的责任和义务。伴随经济全球化的步伐,健康问题也日益成为全球性话题。传统上局限于单一学科、单一组织、一国之力来解决健康问题的思想和做法遭遇到巨大的挑战。与此同时,与全球健康有关的思想理论、科学研究、人才培养和实践活动迅速发展。美国已有数十所高校先后建立了全球健康研究中心(所)或开办全球健康学专业,包括哈佛大学、匹兹堡大学、杜克大学等著名高校。与此同时,以“Global Health”为主题的学术期刊也随之创刊发行。2008年《Global Health Action》在瑞典正式创刊;2011年爱丁堡大学主办的《Journal of Global Health》创刊;同年,美国哥伦比亚大学的学生期刊《The Journal of Global Health》创刊;2013年柳叶刀子刊《Lancet Global Health》创刊。而到本刊创刊时为止,我国还没有一本属于这个领域的专业学术期刊。为了更好地推动我国全球健康学领域的学术研究、人才培养和社会服务,我们推出了这本崭新的学术刊物。

《全球健康学杂志》创刊号的如期面世离不开广

大学界同仁和编委会、编辑部成员的集体努力和大力支持!陈心广教授于2012年第一次到武汉大学全球健康研究中心就提出并强烈建议创办全球健康刊物,作为全球健康发展的旗帜和学术交流的平台。全球健康研究中心全体成员为《全球健康学杂志》的创刊付出了长期不懈努力,奠定了创刊的基础,并于2013年秋成立了《全球健康学杂志》编委会。创刊号所收录的文章,既有来自国内外高等院校从事全球健康学术教学和研究的专家教授,也有从事全球健康实践工作的国家卫生和计划生育委员会的行政管理者。创刊期间,鲁元安教授还专门就稿件格式和形式给予了具体的指导,并就和国际接轨提出了很好的建设性意见。在此,对所有同仁和朋友的关心支持,以及编委、编辑人员的辛勤努力表示衷心感谢!

全球健康学是一个跨学科、跨国界的新兴领域。开展全球健康学研究具有重要的理论价值与现实意义。我们将致力于把《全球健康学杂志》打造成为科研、教学和服务的信息平台,成为各界同仁进行学术交流和学术切磋的园地,学术争鸣和学术批判的阵地。真诚欢迎国内外各界从事全球健康教学研究的专家、学者们不吝赐稿。质量就是期刊的生命,学界同仁们关心支持是本刊成功的保障。我们热切期待大家为本刊推荐更多、更好的稿件,也期待学界朋友们的批评意见,使《全球健康学杂志》越办越好。由于本刊初创伊始,经验缺乏,仓促之间,工作中难免会有疏漏,敬请广大读者、作者多提宝贵意见,积极推介,共同努力扶植本刊的发展。让本刊为推动中国全球健康学事业的进步发挥重要的作用。

冯友梅 主编

2014年3月于珞珈山

亚太公共卫生学术联盟与我国公共卫生教育的发展

王 波¹, 李立明²

1. 中国医学科学院健康科普研究中心, 北京 100730; 2. 中国医学科学院/北京协和医学院, 北京 100730

摘 要: 首先介绍了亚太公共卫生学术联盟的使命与目标、组织机构、主要活动、经费来源和卓越领导者, 以及在促进地区合作与交流、开展人员培训和师生交流项目、开展科研合作与交流、支持成员国的应急与救灾活动、支持公共卫生教育改革等方面对我国公共卫生的贡献; 其次总结了我国公共卫生教育的发展过程、特点和改革方向; 最后展望了亚太公共卫生学术联盟与我国的合作前景。

关键词: 亚太公共卫生学术联盟; 公共卫生教育; 公共卫生教育认证

亚太公共卫生学术联盟(Asia-Pacific Academic Consortium for Public Health, APACPH)是亚太地区非政府国际学术组织, 素有公共卫生领域“APAC”之称。多年来, APACPH 对我国公共卫生教育的发展做出了积极的贡献。

1 APACPH 介绍^[1]

1.1 使命与目标

APACPH 于 1984 年 1 月在美国夏威夷大学成立, 其使命为通过成员机构提供的教育、研究和人群健康服务, 增强地区改善生活质量、关注重大公共卫生挑战的能力。理想是亚太区各国所有民众能够获得最高水平的健康。APACPH 的目标包括: ①改善公共卫生教育和培训项目的质量与相关性; ②扩展知识, 改进技能, 验证干预效果; ③提高对已有、新出现和死灰复燃公共卫生问题的认识, 并制定行动项目予以解决; ④改善公共卫生系统的能力和可持续性; ⑤协助开展卫生政策制定和卫生领导力开发。

1.2 组织结构

APACPH 执委会由 APACPH 官员和地区负责人组成。APACPH 官员包括主席、候任主席、副主席、名誉秘书长、名誉司库和总干事。地区办公室

分别位于墨尔本、北京、东京、曼谷、檀香山和洛杉矶, 负责所在地区的联络。APACPH 秘书处位于吉隆坡。作为一个多国的、非政府学术组织, APACPH 现有来自 23 个国家/地区(澳大利亚、孟加拉国、斐济、柬埔寨、中国香港、印度、印尼、日本、哈萨克斯坦、韩国、老挝、马来西亚、尼泊尔、蒙古、新西兰、中国大陆、菲律宾、新加坡、斯里兰卡、中国台湾、泰国、美国、越南)的 83 个成员机构。

1.3 主要活动

APACPH 主要开展五个方面的活动: ①倡导与领导。共计召开了 45 届 APACPH 大会(表 1)和 3 届 APACPH 成员大学校长会, 并设置了领导成就奖、公共卫生优秀奖、卓越领导奖等奖项。②改善教育。先后实施了远程在线学习项目、早期职业网络培训、公共卫生教育认证、成员机构间师生交流项目、公共卫生课程发展项目等。③科研支持。通过微基金项目(1000 \$ -5000 \$)向学生论文和小型研究课题提供资助; 通过小种子基金项目改善亚太区欠发达的国家公共卫生; 组建了亚太区环境和职业流行病学网络(Environmental and Occupational Epidemiology Network in the Asia-Pacific Region, EOENAPR); 并大力促进成员机构之间的科研合作(如 APACPH 海啸项目)。④举办研究交流与出版

收稿日期: 2014-01-10; 修回日期: 2014-02-21

作者简介: 王波, 中国医学科学院健康科普研究中心助理研究员; 李立明, 中国医学科学院/北京协和医学院党委书记、常务副校长

通讯作者: 李立明, 中国医学科学院/北京协和医学院。E-mail: lmllee@pumc.edu.cn

物。通过举办各类学术会议促进亚太区公共卫生领域的学术交流;创办了亚太公共卫生杂志(Asia-Pacific Journal of Public Health),该杂志当前影响因子为 1.056。⑤改善健康。积极实施社区项目,如使用头盔预防伤害;提供改善健康的咨询服务。

表 1 近 10 年来 APACPH 大会一览表

大会	时间	地点	主办方
34 届	2002	马来西亚吉隆坡	马来亚大学
35 届	2003	中国上海	中国疾病预防控制中心
36 届	2004	澳大利亚布里斯班	昆士兰理工大学
37 届	2005	中国台北	台湾流行病学学会
38 届	2006	泰国曼谷	玛希隆大学
39 届	2007	日本埼玉	香川营养学会
40 届	2008	马来西亚吉隆坡	马来亚大学
41 届	2009	中国台北	台北医学大学
42 届	2010	印尼巴厘岛	印尼大学
43 届	2011	韩国首尔	延世大学
44 届	2012	斯里兰卡科伦坡	科伦坡大学
45 届	2013	中国武汉	武汉大学

1.4 经费来源

APACPH 的主要资金来源包括成员会费、杂志

订阅费、大会注册费、学术咨询费、研究资助,以及来自成员机构、国际组织(世界卫生组织、联合国儿基会、美国中华医学基金会、世界银行)、政府机构(美国国际开发署、日本国立保健医疗科学研究所、澳大利亚国际发展署、美国公共卫生署)和慈善机构(大西洋慈善基金)的资金。美国中华医学基金会曾在 20 世纪 80 年代至 90 年代为我国 7 所公共卫生学院提供了专门资助,用于缴纳 APACPH 成员会费和参加 APACPH 会议的交通费。

1.5 卓越领导者

在 APACPH 发展的过程中,有许多学者做出了重要的贡献(图 1)。1984 年 APACPH 的成立主要由 5 位创始院长所推动,即北京医科大学公共卫生学院院长王天根、夏威夷大学公共卫生学院院长 Jerrold Michael、菲律宾大学公共卫生学院院长 Jane Baltazar、玛希隆大学公共卫生学院院长 Debbanom Muangman、新加坡国立大学公共卫生学院院长 Wai-on Phoon^[2]。我国也有多名学者曾担任过 APACPH 官员,如本文作者李立明曾任 APACPH 主席,王天根、庄辉和唐金陵等学者曾任副主席。



图 1 参加 APACPH 成立大会的亚太各国公共卫生学者

2 APACPH 对我国公共卫生的贡献

2.1 促进地区合作与交流

来自我国的 APACPH 成员机构共 19 个,分别是中国大陆 14 个(中南大学、中国医科大学、中国疾

病预防控制中心、复旦大学、华中科技大学、南京医科大学、北京大学、北京协和医学院、四川大学、中山医科大学、新疆医科大学、西安交通大学、武汉大学、浙江大学)、中国台湾 4 个(高雄医学大学、国立台湾大学、台北医学大学、慈济大学)、中国香港 1 个(香港中文大学)。APACPH 对于促进中国成员机构间

和中国与国外成员机构间的交流具有重要意义。为了更好地促进地区合作, APACPH 专门在北京设立了地区办公室, 由李立明教授和胡永华教授担任主任。迄今为止, 中国大陆已成功举办了 4 届 APACPH 大会(1984 年, 1994 年, 2003 年和 2013 年)。

2.2 开展人员培训和师生交流项目

在我国举办的 1994 年第 22 届 APACPH 大会和 2013 年第 45 届 APACPH 大会, 在会前举办了“公共卫生教育改革与复兴”、“公共卫生学术文章的科学写作与期刊发表”、“如何监测环境水中的人肠道病毒”等培训班, 许多年轻的公共卫生学者参加了相应的培训^[3]。成员机构之间的师生交流项目也蓬勃开展, 如北京协和医学院与香港中文大学和台大医学院之间的交流项目。

2.3 开展科研合作与交流

在 APACPH 的组织与协调下, 来自我国的 7 个学术机构参加了亚太儿童韧性研究。该研究旨在研究社会、环境因素与儿童韧性的关系, 已纳入来自我国 5 个城市的 16000 多名儿童^[1]。2011 年在我国杭州召开了亚太慢病高峰论坛, 该论坛主要关注亚太区慢病防控, 来自 APACPH 的慢病专家进行了大会学术报告。

2.4 支持成员国的应急与救灾活动

APACPH 对应急与救灾十分关注, 体现为: ① 2005 年在中国台北召开的第 37 届 APACPH 大会主题为“灾难管理”。② 2006 年亚太公共卫生杂志专门设立了“健康保障与灾难管理”专刊。③ 2006 年在斯里兰卡举办灾难管理培训班。2005 年、2006 年的北京论坛专门设立了关注公共卫生应急的公共卫生分论坛, APACPH 均派专家参加, 并分享了他们的经验和观点。

2.5 支持公共卫生教育改革

2011 年全国公共卫生学院院长会上, 来自 APACPH 的代表与我国公共卫生学院院长讨论了中国公共卫生教育改革的内容和方向。2011 年在韩国首尔召开的第 43 届 APACPH 大会期间, APACPH 专门召集来自中国的成员机构, 讨论了未来 APACPH 与我国公共卫生学院的合作。2012 年, 在四川成都召开了首届 APACPH-中国 MPH 认证与课程研讨会, APACPH 报告了对公共卫生教育认证的流程和内容, 并讨论了未来在公共卫生教育认证上的合作

3 我国公共卫生教育的现状与发展

3.1 我国公共卫生教育的发展过程

早在 20 世纪 20—30 年代, 我国就在河北定县开展了公共卫生实践教学。20 世纪 50—70 年代, 我国引入了苏联的卫生体系和教育体系, 医学教育以生物医学模式为主, 公共卫生主要课程以流行病学和五大卫生为代表。自 20 世纪 80 年代起, 我国开始引入与实践生物-心理-社会医学模式, 并开始实施研究生教育。当前, 本科教育是我国公共卫生教育的主体, 开展本科教育的院系数量达到了 84 所; 研究生教育则以科学学位为主, 同时在 30 家医学院校开展了公共卫生硕士学位(Master of Public Health, MPH)的试点工作, 定位于应用型人才培养, 此外也启动了公共卫生博士(Dr. PH)培养的研讨工作。

3.2 我国公共卫生教育的特点

当前我国公共卫生教育具有以下几个特征: 生物医学为基础的预防医学教育; 本科教育为主; 研究生教育中科学学位为主; 传统的教与学过程; 理论和知识为基础的教学。

3.3 对我国公共卫生教育改革的展望

①重新定位公共卫生教育的培养目标; ②明确公共卫生教育的层次与类型; ③明确培养的基本要求与核心能力; ④改革教学方法与内容; ⑤加强师资队伍建设和; ⑥加强公共卫生实践能力培养。

4 展望未来: APACPH 与中国的合作

从某种意义上讲, 公共卫生就是全球卫生^[4]。①公共卫生问题无边界。传染病的大流行、灾难(如地震、海啸)、环境问题(如气候变化)等通常没有国界。②公共卫生教育无边界。当前, 全球在公共卫生教育、科研等方面的交流日益频繁, 大规模开放网络课程(Massive Open Online Courses, MOOCs)正席卷全球。③全球化的卫生人力。

公共卫生教育认证是持续改进教育质量的要求, 是公共卫生教育变革的要求(特别是公共卫生教育机构不断增加、教育扩招、多样化的教学形态、师生交流等情况下), 是教育管理机构的准入/淘汰的要求, 也是对教育机构外部认可的要求。APACPH 对

公共卫生教育进行认证的流程(图 2)为我们国家开展公共卫生教育认证提供了良好的借鉴。

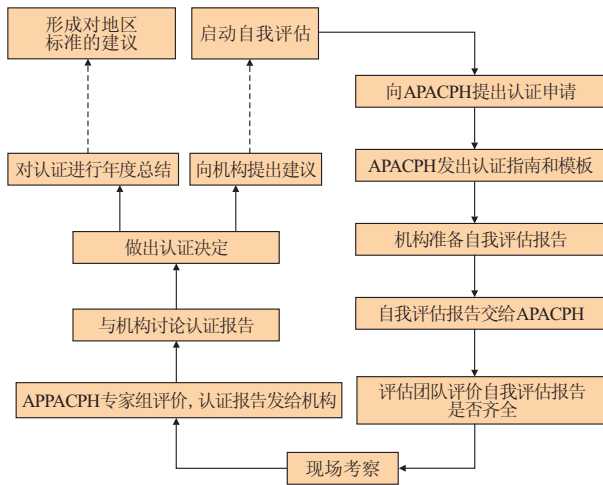


图 2 APACPH 公共卫生教育认证流程

APACPH 与中国公共卫生的合作将有利于加强地区公共卫生教育的合作与交流,加强开展针对共同的区域性公共卫生问题的研究和应对,共享公共卫生教育的资源,推动双边和多边科研合作,最终实现双赢和多赢。

参考文献

- [1] Asia-Pacific Academic Consortium for Public Health. 2004 [2014-02-21]. <http://www.apacph.org/wp/>.
- [2] Michael JM. The Asia Pacific Academic Consortium for Public Health (APACPH) the first ten years, from 1984 to 1994. *Asia-pacific Journal of Public Health*, 2005, 17(2): 66-70.
- [3] The 45th APACPH Conference 2013. 2013 [2014-02-21]. <http://www.apacph2013.org/>.
- [4] Fried LP, Bentley ME, Buekens P, et al. Global health is public health. *Lancet*, 2010, 375(9714): 535-537.

APACPH and Public Health Education in China

Bo Wang¹, Liming Li²

1. Chinese Academy of Medical Sciences Health science research center, Beijing 100730 China;

2. Chinese Academy of Medical Sciences / Beijing Union Medical College, Beijing 100730, China

Abstract: Firstly, an introduction of APACPH, including the mission and objectives, organizational structure, main activities, major funding sources and extraordinary leaders, was provided. The contribution of APACPH to China's public health, in terms of regional collaboration and communication, training and faculty/students exchanges, research cooperation and communication, emergency preparedness and disaster management, and Public Health Education Reform, was described. Secondly, the development process, characteristics and reform of China's public health education were summarized. Finally, future cooperation between APACPH and China was expected.

Key words: APACPH; public health education; public health education accreditation

中国与全球卫生：理念与未来

任明辉，卢国萍

国家卫生和计划生育委员会国际合作司，北京 100044

摘要：全球化浪潮席卷每个角落，卫生和健康问题已经成为了全球发展的核心和重要的非传统安全问题。各国不可能独善其身，急需采取协同行动，集结多方资源，开展全球卫生合作。中国自身的卫生发展经历可以为全球卫生提供有价值的经验和理念。中国在双边、多边，以及地区和全球层面，已成为全球卫生的重要国家行为体。当前，中国需要以全新的视角、全范围地参与全球卫生事务，开展全球卫生战略研究。

关键词：全球卫生；理念；未来

进入本世纪以来，全球化浪潮席卷每个角落。随着人员货物往来增加、经济相互交融增强，国家边境日益模糊或弱化，卫生和健康问题的全球化已是不争的事实。如果说 2003 年非典疫情使人们认识到疾病无国界，那么随后拉美地区首发的 H1N1 人感染禽流感、欧洲地区的“毒黄瓜”等事件充分说明，无论国家经济发展水平如何，面对卫生问题，任何一个国家无一幸免。卫生和健康问题已经成为了全球发展的核心，与环境、能源、气候变化问题一起成为重要的非传统安全问题。与此同时，许多国家越来越深刻地体会到，投资于健康就是投资于社会发展。面对全球和区域性的卫生问题，各国不可能独善其身，急需采取协同行动，集结政府、非政府组织、企业和个人等多方资源，开展全球卫生合作，才能维护好本国人民的公共安全。作为一个发展中的大国，中国在全球卫生中所发挥的作用，受到各方关注。

1 中国的全球卫生，首先离不开中国的自身卫生发展的经历

这是中国全球卫生发展的基础和起点，也是中

国全球卫生的特点。

建国以来，中国以第一人口大国屹立在世界的东方。中国的卫生状况、健康水平，与全球卫生状况的改善和健康水平的提高，有着举足轻重的关系。中国卫生发展之路经历了建国之初的百废待兴、蓬勃兴旺、“文革”期间的停滞动荡，以及改革开放之后的探索、改革和不断深化改革的历史阶段。在过去的 60 多年的卫生发展进程中，中国的健康指标不断改善，并建立了城乡医疗卫生保健网、预防卫生服务体系和医疗保障体系。特别是进入新世纪以来，中国政府实施了世界上人口最多的医药卫生体制改革，建立了覆盖全民的基本医疗保障制度、覆盖城乡的医疗卫生服务体系，开展国家基本公共卫生服务和重大公共卫生服务项目，加大力度改革公立医院，极大改善了医疗服务的公平性、可及性和有效性，并提前实现降低孕产妇死亡率、婴幼儿死亡率等联合国千年发展目标中的健康指标。

同时，在中国卫生发展的进程中，得到了国际社会的支持与合作，受益匪浅。世界卫生组织、世界银行、全球抗击艾滋病、结核病和疟疾基金等多边伙伴，美国、英国、澳大利亚和日本等双边机构，以及盖茨基金会等非政府组织，提供了大量国际先进技术

收稿日期：2014-02-06；修回日期：2014-02-25

作者简介：任明辉，国家卫生和计划生育委员会国际合作司司长；卢国萍，国家卫生和计划生育委员会国际合作司欧美处处长

通讯作者：任明辉，国家卫生和计划生育委员会国际合作司。E-mail: renmh@moh.gov.cn

和管理理念、资金。中国充分利用这些国际援助和合作项目,转化成符合中国国情的卫生改革与发展规划、战略与措施,内化在自身的卫生服务体系中。

因此说,中国自身的卫生发展经历可以为全球卫生提供有价值的经验和理念。没有中国卫生的发展,就无从谈起中国未来在全球卫生中可能发挥的作用。中国卫生改革与发展的经验和教训远比金钱对全球卫生的作用更大,影响更为深远。这是中国软实力的一个重要体现。

2 中国是全球卫生的积极倡导者、实践者,一直为致力于改善全球卫生状况作着力所能及的贡献

中国早在上世纪 60 年,在本国经济发展依然十分困难、卫生状况亟待解决的情况下,从国际人道主义出发,开展了全球卫生发展合作。1963 年开始,坚持向非洲等发展中国家派遣长期援外医疗队。之后,并逐步扩展到援建医疗设施、捐赠药品器械、开展人力资源培训,以及设立抗疟中心、开展免费白内障手术“光明行”等多种双边卫生合作。

此外,中国推动开展东盟、东亚地区等周边地区卫生合作。2003 年非典之后,建立 10+1(中国与东盟)合作机制卫生部长会议,中国政府率先出资 1000 万元,设立东盟公共卫生专项基金,并陆续增资。积极参与亚太经合组织、上海合作组织框架下的卫生合作与交流。2011 年在华举办首届金砖国家卫生部长会议。

最近 10 年,中国成为全球层面的卫生合作积极推动者。2002 年积极支持成立全球抗击艾滋病、结核病和疟疾基金,并向该基金自愿捐赠,至今累计 3000 万美元。2006 年在华举办禽流感防控筹资大会,向联合国机构捐资 1000 万美元。2013 年中国成为联合国第六大会费国之后,中国政府继续向世界卫生组织、联合国艾滋病规划署增进自愿捐款,并派遣卫生技术专家参与巴基斯坦脊髓消除等全球卫生安全行动。

中国参与了世界卫生组织、联合国艾滋病规划署、全球抗击艾滋病、结核病和疟疾基金等重要国际组织的决策机制,以及相关的全球卫生治理专家咨询,包括天花消除、医学伦理、健康的社会决定因素委员会、卫生研发筹资、国际卫生条例、结核病、计划

免疫等,为联大公共卫生决议等全球卫生政策和标准制订做出了积极贡献。

总之,中国在双边、多边,以及地区和全球层面,已成为全球卫生的重要国家行为体。

3 中国需要以全新的视角、全范围地参与全球卫生事务,开展全球卫生战略研究

当今世界,中国的发展离不开世界,世界的发展离不开中国。中国卫生与全球卫生紧密相连。经济贸易、传染病、食物生产、加工、销售链等,将全球连成一个地球村。中国借助经济全球化迅速发展了经济,中国的经济利益已经远远超过了 960 万平方公里的疆土。在经济全球化、健康无国界的背景下,中国的卫生必然需要站在全球化的角度给予审视和研究。

然而,世界卫生状况并不太平。新发传染病层出不穷、慢性非传染病疾病的威胁日益严重。全球健康不公平现象严重,发达国家与发展中国家差距,以及地区之间差距、贫富人群之间差距拉大。

因此,全球卫生合作和发展需要审视新的国际形势,结合中国国内发展,创新理念,开拓进取。卫生是全球公共产品,需要全球治理,纳入全球发展议程,得到各方的支持,包括政府、非政府、企业、社团、个人等利益群体。据了解,美国销售的面粉涉及到 40 多个国家和地区的生产、储存和加工环节,因此大约在 10 年前美国食品药品监督管理局在中国设立了食品安全检查。美国疾病预防控制中心在全球主要国家设立了全球疾病早发现点,还大量派出人员到世界卫生组织工作。目前,美国、英国、瑞士、挪威、日本等发达国家已颁发了其全球卫生战略文件,全球卫生已上升为这些国家对外战略的一部分。巴西、泰国等发展中大国正在积极研究之中。建立一个国家的整合战略,从长远角度维护国家利益,促进人类发展,成为许多国家的迫切需要。

联合国大会 2007 年通过一项决议,呼吁各国加强公共卫生和外交政策的协调。中国虽然在开展援外医疗队等卫生援助、参与国际卫生谈判、推荐世卫组织国际职员、构建区域性卫生合作组织和机制等方面,做了大量的工作,但是缺乏前瞻思考和战略规划,缺乏相应的学科支持和队伍人才,尚未形成统一

的国家全球卫生战略。无论从国家和平崛起、建立和谐世界的视角,还是从发挥卫生外交的软实力,解决全球或区域性健康问题的实际出发,制定中国全球卫生战略既是“必要”、“急需”,更是“到时候”了。中国的全球卫生不应该仅仅是传统意义上的“援助”、“贡献”,也是自我发展的需要,更是一个民族和

负责任国家的使命所在。

因此,开展中国全球卫生战略研究,推动政府相关部门逐步凝聚共识,调动社团、企业的参与形成合力,支持学科建设、专家研究,应是未来 10 年中国卫生领域对外交流与合作的重点工作。

China and Global Health: Concept and Future

Minghui Ren, Guoping Lu

Department of International Cooperation, National Health and Family Planning Commission, Beijing 100044, China

Abstract: Globalization is sweeping every corner. Health issues have become the core of global development and are among important non-traditional security issues. No countries can deal with it alone, and there is a need to take coordinated action with diverse resources and to work on global health cooperatively. China's experience of its own health care development provides valuable visions and thoughts for global health. China has been the important state actor of global health in bilateral, multilateral, the regional and global levels. At present, it is necessary for China to engage in the global health and conduct the research on global health strategy from a new and full perspective.

Key words: Global health; concept; future

中国南南卫生合作研究联盟年会召开

2014 年 2 月 10 日,中国南南卫生合作研究联盟年会在北京大学全球卫生研究中心召开。国内 27 家研究机构参会并正式加入该联盟。

现任秘书长北京大学全球卫生研究中心的鲁新教授总结了该联盟自成立以来所做的主要工作,代表联盟秘书处提出了联盟章程的修改意见,并推选出新一轮的联盟领导人员:清华大学公共健康研究中心程峰教授担任联盟秘书长,副秘书长由中国医药保健品进出口商会许铭博士和武汉大学公共卫生学院院长、全球健康研究中心主任毛宗福教授担任。联盟分设学术指导委员会;特别工作组和顾问委员会。清华大学公共健康中心将作为 2014—2015 届联盟秘书处所在地。会议对 2014 年中非圆桌会议的研究议题进行了深入的讨论,并向参会的科研单位发出了研究课题的项目意向书。

(通讯员:梁晓晖,孙杨)

全球视角下的卫生政策：为促进健康公平而努力

孟庆跃

北京大学中国卫生发展研究中心, 北京 100191

摘要：全球健康的核心目标是改善健康公平性,提高人类健康水平。卫生政策对于全球健康和健康公平有着重要的影响作用,基于全球视角的卫生政策研究,对于促进全球健康科学发展具有十分重要的意义。过去三十多年,促进健康公平一直是主要国际组织特别是联合国系统社会发展政策的核心。从上世纪七十年代的初级卫生保健,到本世纪初的联合国千年发展目标,以及最近的全民健康覆盖,都以最需要支持的地区 and 人群为重点,通过提出和鼓励各个国家实施一系列政策、策略和措施,以期实现持续和公平的改善健康状况的目标。本文对主要的全球健康政策进行了介绍。

关键词：全球健康；卫生政策；公平

学术界对全球健康(Global Health)的理解并不一致,世界各国对其重视的程度也相差很大。但是,讨论、研究和传播全球健康的终极目标应当是一致的,即提升全人类整体健康水平,改善全球健康公平性。国际卫生政策是全球健康的重要组成部分,本文在分析全球健康形势的基础上,介绍几项主要的全球卫生政策和策略。

1 全球健康形势

经济社会发展和卫生体系加强,推动着健康状况不断改善。1990—2011年(孕产妇死亡率到2010年)全球主要健康指标明显提升,其中,平均期望寿命增加了6岁,每五年增加1.5岁;5岁以下儿童死亡率下降了三分之一;孕产妇死亡率下降接近一半(见表1)^[1]。

在整体健康水平提高的同时,世界上区域间健康差距仍然巨大。非洲是全世界健康状况最差的区域。1990年,非洲与欧洲平均期望寿命相差22岁,与东南亚(平均期望寿命倒数第二的区域)相差9岁;2011年,非洲与欧洲平均期望寿命差距缩小了2

岁,但仍然有20岁的差距,与东南亚的差距扩大到11岁。东南亚和中东地区与人均期望寿命较高的三个区域也相差10岁左右。5岁以下儿童死亡率和孕产妇死亡率也有同样的趋势。虽然非洲等区域健康状况得到了很大提高,但是与先进区域的差距仍然巨大。比如,2010年非洲孕产妇死亡率比全球20年前(1990年)的平均水平还要高,也就是说,非洲这一指标落后了全球平均水平20年。缩小健康差距,需要全球更大的努力。

表1 全球主要健康指标比较

区域	平均期望寿命 (岁)		5岁以下儿童死亡率 (1/1000)		孕产妇死亡率 (1/10万)	
	1990	2011	1990	2011	1990	2010
全球	64	70	87	51	400	210
非洲	50	56	175	107	820	480
美洲	71	76	42	16	100	63
东南亚	59	67	109	55	590	200
欧洲	72	76	32	13	44	20
中东	61	68	99	58	430	250
西太区	70	76	48	16	140	49

资料来源:World Health Organization, World Health Statistics 2013

收稿日期:2014-01-17;修回日期:2014-02-25

作者简介:孟庆跃,北京大学中国卫生发展研究中心主任

通讯作者:孟庆跃,北京大学中国卫生发展研究中心。E-mail: qmeng@bjmu.edu.cn

健康状况决定于多种因素,包括经济社会发展水平、自然环境、卫生体系、行为和生活方式、生物遗传因素等等。这也决定着,提升全球健康水平和缩小区域间健康状况的差距,需要从根本上解决发展不平衡的问题。

2 全球卫生政策

全球卫生政策对于全球健康和健康公平有着重要的影响作用。过去三十多年,促进健康公平一直是主要国际组织特别是联合国系统社会发展政策的核心。从上世纪七十年代末的初级卫生保健,到本世纪初的联合国千年发展目标,以及最近的全民健康覆盖,都以最需要支持的地区和人群为重点,通过提出和鼓励各个国家实施一系列政策、策略和措施,以期实现持续和公平的改善健康状况的目标。

2.1 初级卫生保健

世界卫生组织 1978 年在《阿拉木图宣言》中明确指出,推行初级卫生保健(Primary Health Care)是实现“2000 年人人享有卫生保健”(Health for All by 2000)战略目标的关键和基本途径。“2000 年人人享有卫生保健”是全球卫生战略目标,人人享有卫生保健是健康公平的基础。初级卫生保健是实现这一战略目标的基本策略。初级卫生保健就是最基本的、人人都能得到的、体现社会平等权利的、人民群众和政府都能负担得起的卫生保健服务。初级卫生保健概念的提出源于对健康影响因素的深刻理解,即健康问题的解决不仅仅依靠卫生部门,更重要的需要依靠整个社会的努力。

初级卫生保健策略强调社会公正、社区参与、部门协调和成本效果等四个方面的原则,强调预防和健康促进等核心服务的重要性。初级卫生包含八项要素,即增进必要的营养和供应充足的安全饮用水,基本的环境卫生,妇幼保健,包括计划生育,主要传染病预防接种,地方病预防和控制,主要卫生问题及其预防控制方法的宣传教育,常见病和创伤的恰当处理,基本药物的供应。

《阿拉木图宣言》发表和初级卫生保健实施三十年后,世界卫生组织对初级卫生保健运动进行了回顾和总结,2008 年世界卫生报告题目就是“初级卫生保健:过去重要,现在更重要”(Primary Health Care: Now More Than Ever)^[2]。报告指出,初级

卫生保健的概念远远超出狭义的医疗服务模式,其目标是达到更好的健康、更少的疾病、更高的公平性,以及有效提高卫生体系的绩效。报告认为,当今即使在最发达的国家,初级卫生保健也未满足应有需求,也普遍存在着重治疗、轻预防,以及医疗专业分类太过精细等问题。为了进一步推动初级卫生保健策略的实施,世界卫生组织再次明确了卫生策略:1)缩小卫生领域的社会差距,实现卫生服务全覆盖;2)卫生服务的模式和内容应满足人们的需求和期望;3)将卫生政策体现在和纳入到所有相关部门政策和工作中;4)改善卫生政策决策和实施机制;5)提高各个利益相关方在健康改善活动中的参与度。

2.2 联合国千年发展目标

联合国千年发展目标(Millennium Development Goals, MDGs)是联合国在 2000 年 9 月千年首脑会议上,世界各国领导人就消除贫穷、饥饿、疾病、文盲、环境恶化和对妇女的歧视,所达成的一系列有时限的目标和指标。目标包括消灭极端贫穷和饥饿;普及小学教育;促进男女平等并赋予妇女权利;降低儿童死亡率;改善孕产妇保健服务;与艾滋病病毒/艾滋病、疟疾和其他疾病作斗争;确保环境的可持续能力;全球合作促进发展。千年发展目标所完成的时间是 2015 年。千年发展目标是一幅由全世界所有国家和主要国际发展机构共同展现的蓝图,是国际社会解决发展不平衡、消除贫困、改善弱势群体健康水平等做出的承诺和重大努力。在八项千年发展目标中,虽然只有三项与健康有直接关系,但是其它目标的实现,包括消除极端贫困、提高教育水平、提升女性地位和环境可持续发展等,都是健康的重要决定因素。可以说,实现千年发展目标,将显著改善全球健康水平,缩小区域间和人群间健康状况的差距。

经过各成员国和国际社会的积极努力,千年发展目标取得了重要进展^[3],包括:与基线年份(1990 年)相比,在全球范围内,生活在极端贫困中的人口比例已经减半;超过 20 亿人能够获得改善的饮用水源;2000 年至 2010 年间,全球疟疾死亡率下降、肺结核死亡率下降均达到目标;发展中国家城市和大都市贫民窟居民的比例在下降。同时,有些目标和指标还需要进一步努力,包括:环境可持续性受到严重威胁,需要更高层次的全球合作;实现到 2015 年

将儿童死亡率降低三分之二和将产妇死亡率降低四分之三的具体目标需要进一步的干预措施和更有力的政治经济支持。

2013年4月5日,距离到2015年实现千年发展目标的时间还剩下1000天,联合国及世界各地举行了各种各样的庆祝活动,联合国秘书长潘基文发表致辞,提出全面实现千年发展目标的主要策略:1)争取扩大成功的范围,主要在健康、教育、能源和卫生等领域进行战略性、有针对性的投资;2)把重点放在最贫穷和最脆弱的国家。这些国家虽然已竭尽所能,但要取得进展仍然困难重重;3)履行财政承诺;4)动员社会所有力量包括政府和基层民众,加快目标的实现。

2.3 全民健康覆盖

全民健康覆盖(Universal Health Coverage, UHC)是世界卫生组织在“人人享有卫生保健”卫生战略基础上提出的旨在促进全球健康公平的新策略。2005年,世界卫生组织通过成员国宣言,提议通过更加公平有效的筹资体系,促进UHC的实现^[4];2010年,世界卫生组织在其年度报告中,提出了一系列通过卫生筹资促进UHC实施的策略、政策和措施^[5]。世界卫生组织对UHC的界定是:所有人都应当享有所需要的有质量的卫生服务,并且不因利用这些服务出现经济困难。卫生服务包括健康促进、预防、治疗和康复等。这个界定强调了卫生服务公平可及性、服务质量和经济风险保护三个重要维度。UHC的核心是公平。从全球视角,实现UHC的主要任务是如何提升欠发达国家卫生服务可及性水平、减轻因病致贫的程度;在国家水平上,主要是在整体卫生服务水平提升的情况下,如何缩小地区间和人群间卫生服务可及性和质量等方面的差距。在许多国家特别是欠发达国家,低收入人群缺乏基本的社会保障,偏远地区缺乏基本的医疗卫生条件,他们做为“全民”中的一部分,应当是UHC工作的核心。

人口覆盖、服务覆盖和费用覆盖是测量UHC实现程度的主要指标^[6]。人口覆盖指服务项目(比如公共卫生项目)、筹资制度(比如社会医疗保险)等覆盖的人口比例。在服务范围和费用覆盖不变的情况下,人口覆盖的比例越高,UHC实现的程度就越

高。服务覆盖是指服务的范围和质量,在其它两个维度不变的情况下,服务覆盖的范围越广、质量越高,UHC实现的程度就越高。费用覆盖是指医疗服务费用通过预付制筹资体系(税收、社会医疗保险等)支付的程度,同理,其他两个维度不变,提高费用覆盖水平,可以提高UHC实现的程度。

实现UHC最重要的是行动。国际上对于如何推进UHC已经取得一些共识,包括^[5,7]:包括:1)对于发展中国家,持续的政治支持是实现UHC最重要的保证,增加卫生筹资和提高资源使用效率是实现UHC最重要的条件;2)加强基层卫生能力建设,动员各方力量参与,提高卫生管理能力,发挥不同所有制卫生服务提供者的作用,是实现UHC的重要路径;3)推动UHC的核心目标是公平,但在资源使用上也需要关注效率,使有限的卫生资源获得最大服务和健康产出;4)弱势群体、经济欠发达地区是UHC关注的重点,卫生体系发展需要以人为中心,而不是以卫生机构的发展为中心。

参考文献

- [1] World Health Organization. World Health Statistics 2013. Geneva: WHO Publications, 2013.
- [2] World Health Organization. World Health Report 2008: Primary health care: now more than ever. Geneva: WHO Publications, 2008.
- [3] 联合国. 2013年千年发展目标报告. 纽约: 2013.
- [4] World Health Organization. Resolution WHA 58.33: Sustainable health financing, universal coverage and social health insurance. Geneva: WHO Publications, 2005.
- [5] World Health Organization. Health systems financing: the path to universal coverage. Geneva: WHO Publications, 2010.
- [6] World Health Organization and World Bank. Monitoring Progress towards Universal Health Coverage at Country and Global Levels: A Framework, 2013 [2014-01-17]. http://www.who.int/healthinfo/country_monitoring_evaluation/universal_healthcoverage/en/.
- [7] The Rockefeller Foundation, Save the Children, the United Nations Children's Fund and the World Health Organization. Universal health coverage: A commitment to close the gap. New York: Rockefeller Foundation, 2013.

Global Health Policy: Efforts for Promoting Health Equity

Qingyue Meng

Peking University China Center for Health Development Studies, Beijing 100191, China

Abstract: Health equity and promotion is one of the most important aim of global health development. Health policy development from global perspective plays critical role in influencing health and promote development of the global health subject. Over the past three decades, health equity has been centered the development and policy aims by many international organizations, especially the UN system, which is reflected from the primary health care, the Millennium Development Goals, and universal health coverage. This article introduces the main global health policies.

Key words: Global health; health policy; equity

中国全球卫生战略研讨会在京召开

2013年12月23日,由国家卫生和计划生育委员会主办的“中国全球卫生战略研讨会”在北京新世纪日航饭店上海厅召开。国家卫生计生委国际司,法制司等相关司局和直属人事单位、国家中医药管理局、国家食品药品监督管理总局、外交部、商务部、部分省市卫生和计生行政部门的有关领导,北京大学、清华大学、复旦大学、武汉大学、北京协和医院公共卫生学院等众多科研机构的学者专家参加了此次研讨会议。

与会专家就下列问题达成了共识:制定中国全球卫生国家战略无疑是必要的。而要在全球化的背景下争取主动和提高信任度,我国在制定战略时需要首先看清自己,了解和满足本国需求,建立具体的自我认识,明确作为发展中国家与发达国家的根本区别,从而找准作为发展中新型大国的国际角色定位;在目标上,应从自己出发,结合不同时期的综合国力,制定分段计划,逐步在全球弘扬自己的价值观;在重点行动领域确定和路径选择上,我国应将理论与实践,硬实力拓展与软实力建设全面结合,兼顾参考学习他国经验与继承发扬中国特色,求同存异,以大约10年为一个阶段,有效地进行规划和统筹。通过此次研讨会,我国全球卫生战略的框架得到了更为全面的完善。

(通讯员:龙虹霏)

浅析我国与非洲南南卫生合作的转变*

季 煦^{1,2}, 卢国萍³, 赵莉娜³

1. 北京大学全球卫生研究中心, 北京 100191; 2. 卫生部人才中心, 北京 100044;
3. 国家卫生计生委国际合作司, 北京 100044

摘 要: 过去 10 年, 非洲大陆正在经历着一场巨大的转变。虽然该地区仍面临诸多经济、社会发展领域的挑战, 尤其是实现联合国千年发展目标的道路异常艰辛, 但不可否认“非洲正步入正轨”。本文分别通过对美、日两国对非政策的转变与其全球卫生战略的实施, 来分析我国将如何继续开展与非洲在卫生领域的务实合作, 通过提高科学决策过程、借助广阔市场力量、创新卫生援助机制、转变卫生合作形式等方式, 提升我国对非南南卫生合作的广度和深度。

关键词: 美日; 全球卫生战略; 南南卫生合作

1 前言

在过去的 10 年里, 非洲大陆, 特别是撒哈拉以南非洲地区, 正在经历着一场巨大的转变。

10 年前, 尽管非洲拥有无可比拟的自然资源, 但是贫穷、疾病、周而复始的冲突、以及军政府的独裁统治曾给这片富饶的土地贴上了“毫无希望的大陆”这一标签^[1]。然而时过境迁, 2011 年英国《经济学人》杂志改口称非洲为“正在崛起的大陆”^[2]。这不仅因为撒哈拉以南非洲地区拥有一些当今世界上增长速度最快的经济体, 如尼日利亚、埃塞俄比亚、乍得、莫桑比克和卢旺达, 使得其投资环境得以改善、私营经济更具活力^[3]。与此同时, 非洲政府的执政方式和经济管理也悄然发生改变, 中产阶层的逐步扩大带动了消费品需求的急剧增长, 使得非洲成为全球企业竞相进入的市场。虽然该地区仍面临诸多经济、社会发展领域的挑战, 尤其是实现联合国千

年发展目标的道路异常艰辛, 但不可否认“非洲正步入正轨”。

随着非洲的巨变, 该大陆与前殖民宗主国的紧密联系被一些新兴大国所改变, 如中国和印度在非进行大规模的投资, 俄罗斯、巴西、土耳其等也逐步扩大与非洲在外交和经济上的接触^[4]。

作为当今全球第一和第三大经济体的美国和日本怎会在此关键时刻错失良机? 在加强对非经济援助的同时, 美日两国近两年来不断尝试利用“软实力”转变对非策略, 利用投资、经济、贸易、卫生等综合举措巩固其在非的话语权, 意在进一步平衡其与中国等新兴大国在非洲大陆的影响。

本文分别通过对美日两国对非政策的转变与其全球卫生战略的实施, 来分析我国将如何继续开展与非洲在卫生领域的务实合作, 通过提高科学决策过程、借助广阔市场力量、创新卫生援助机制、转变卫生合作形式等方式, 提升我国对非南南卫生合作的广度和深度。

收稿日期: 2014-01-30; 修回日期: 2014-02-23

* 本文为 2013 年中国卫生论坛“中非卫生青年领袖圆桌会议”特约文章。

作者简介: 季煦, 北京大学全球卫生研究中心主任助理、卫生部人才中心助理研究员; 卢国萍, 国家卫生计生委国际合作司欧美处处长; 赵莉娜, 国家卫生计生委国际合作司亚太处处长

通讯作者: 季煦, 北京大学全球卫生研究中心、卫生部人才中心。E-mail: jixu@nhfpc.gov.cn

2 美国对非政策与其全球卫生战略

2.1 美国对非政策的转变

在过去 10 年,美国错失与新非洲建立新型关系的良机,不论是美国政府,还是美国工商企业,与非洲的接触范围都较为局限^[5]。这使得新兴国家一举超越其在非洲的影响力。

2012 年 6 月,美国政府发表了对撒哈拉以南非洲的战略报告。报告提出了美国在非的战略重点,认为“对于美国而言,非洲是一机遇和希望日益增多的地区,因此将对‘非洲民主’的支持作为攸关美国利益之举以及美国在海外领导力的基本组成部分”;新战略还将“推动经济增长、贸易和投资”,“推动和平与安全”以及“促进非洲机遇和发展”列为美国在撒哈拉以南非洲地区的另外三个战略目标^[6]。新战略融合了奥巴马就职以来所推出的诸多倡议,以平衡美在撒哈拉以南非洲的长期利益与短期需要。

美国总统奥巴马 2013 年 6 月 26 日至 7 月 3 日的非洲之行可视为美国正在贯彻新的撒哈拉以南非洲战略以确保非洲在美国全球战略中的地位^[7]。正如布鲁金斯学会非洲发展行动计划小组发布的研究报告所指,非洲作为美国当前优先考虑的原因主要有 5 点:国家安全、能源需求、贸易投资、发展援助和中国因素^[8]。

2.2 美国的全球卫生战略

过去 10 年,美国在防治艾滋病和其他传染性等疾病等方面投入了巨资,美国外交与全球卫生之间的关系也逐步明晰。正如美国战略与国际问题研究中心在其近期发布的报告中指出,美国在全球卫生方面的领导地位与其核心利益相关:(1)可通过挽救生命和改善人们的生活实现共同的人道主义价值观;(2)可加强卫生安全,抵御非传统安全威胁;(3)为发展中国家改善健康状况,促进这些地区的繁荣和稳定^[9]。鉴于此,尽管美国的整体经济环境尚未从 2009 年的金融危机中彻底恢复,但支持全球卫生仍旧成为美国政府及其预算编制的优先事项。

2009 年,在时任国务卿克林顿的倡导下,奥巴马政府提出了“全球卫生倡议”,旨在为美国的全球卫生政策和计划提供一个组织框架,但是由于美国的全球卫生政策缺乏连贯统一的构想,且由于相关部门,如美国国际开发署、全球艾滋病协调员办公室

和美国疾病预防控制中心之间的矛盾不断,导致该倡议未能坚持到底。

然而,“全球卫生倡议”实施过程中的 5 项指导原则值得借鉴:

——理顺国内机构间关系。协调全球卫生有关部门,组建统一平台,以此为契机,积极协调地与伙伴国家实施各类跨机构卫生项目。

——提升对性别平等的关注。在各种项目的设计和实施过程中,重视男女平等,将促进妇女健康及赋权作为各类项目的核心原则之一。

——重视国家所有权。根据各自国家发展战略,协助其制定有关政策,并帮助它们提高自身的管理、监督、协调和运作卫生项目的的能力。

——加强对多边组织的支持。加强与全球基金、全球疫苗免疫联盟的合作,协助其进行内部改革,适时进行战略干预。

——注重项目的成果评估。重视项目的成本效益,参与确定目标、设定指标、衡量海外卫生项目的成果,终止表现欠佳的项目。

与此同时,美国政府的一些非技术性机构还扩大了全球卫生伙伴关系的视野,意在通过与非政府组织、国际组织、慈善基金会和私营部门的合作,启动具有创新意义的公私合作模式,以更有效地实现美国外交政策目标^[10]。

非洲是美国全球卫生战略的重点,美国至少与 38 个国家建立了全球卫生合作关系^[11],在这些非洲国家实施众多的卫生干预项目^[12]。除“美国总统防治艾滋病紧急救援计划”等重点项目外,近年来还开展了针对不同人群的特别项目,如:在乌干达和赞比亚率先开展的“拯救母亲,给予生命”妇幼健康 5 年计划,在肯尼亚、坦桑尼亚和津巴布韦启动的“共同为了女孩”预防家暴计划,以及在撒哈拉以南非洲广泛开展的“粉色彩虹,红色彩虹”防治妇女双癌计划等。

3 日本对非政策与其全球卫生战略

3.1 日本对非政策的转变

2013 年 6 月 1 日至 3 日,第 5 届东京非洲发展国际会议在横滨召开。来自非洲 51 个国家的政要、世界银行和非政府组织在会上均谈及对传统大规模援助项目进行国际投资的必要性,如道路、桥梁、水坝、铁路、港口和电网等。同时与会者还呼吁日本和

国际投资不只是为了提高其国民生产总值,更要为非洲提供就业机会,促进非洲的政治稳定^[13]。

6月3日,大会通过了《2013年横滨宣言》,指出:为实现非洲的可持续发展,将促进民间机构成为经济发展的主导力量,推进基础设施建设,在应对气候变化条件下加强农业建设,提高非洲卫生医疗和教育水平,支持非洲2015年前实现联合国千年发展目标等^[14]。

东京非洲发展国际会议已有20年的历史。1993年,为了帮助非洲摆脱贫困,同时在联合国安理会“入常”议题上得到更多支持,日本启动了这一日非对话机制。前4届会议更多关注非洲的发展、安全与和平,而第5届会议的主题则聚焦投资和贸易。

这种从援助到投资的转变,不仅仅可以帮助日本恢复长期低迷的国内经济,促进日本企业找到更多商机,更重要的是可以通过此举扭转日本在非洲落后于部分新兴国家的尴尬局面。据法国《外交世界》报导,2011年中国对非的投资达162亿美元,而日本则仅为80亿美元^[15]。在此次东京非洲发展国际会议上,日本明确提出要改变援助模式,由以往依赖政府的援助转变为依靠民间企业的投资,同时通过加强非洲人才的能力建设等方式提高对非援助的“质量”,以对决中国依靠“数量”取胜的援助方式。

3.2 日本的全球卫生战略

日本的官方发展援助可以追溯到20世纪50年代。二战后,为了恢复与邻国的政治关系、巩固国内经济发展,日本开始向新独立的东南亚国家提供援助资金,旨在“让日本和平地回归亚洲”。自1979年起至90年代末,中国成为日本援助亚洲的主要受益国。随后,日本的援助延伸至非洲,1993年第1届东京非洲发展国际会议在日召开。根据经济合作与发展组织排名,日本在1989年超过美国,成为世界第一大捐赠国,这一位置保持到2001年^[16]。

受到战后强调经济发展和加强日美同盟关系影响,日本的对外援助很大程度受到经济和政治利益的相互作用^[17],而其最初援助形式过于关注日本企业的自身商业利益,忽视援助过程中一些既有的规则,也曾一直为其他援助国所诟病^[18]。卫生领域的援助在日本官方发展援助的份额极少,仅为2%左右^[19]。

在2000年冲绳八国峰会后,日本逐步意识到全

球卫生在对外发展援助中的重要性,主要原因有:(1)国际社会尤其是美国对于全球卫生的关注愈来愈多,投入逐步增大;(2)新发传染病的全球性传播,使得日本即便作为岛国也不能独善其身;(3)日本健全的医疗保障体系和成功的养老制度,可为其他发展中国家所借鉴;(4)全球卫生概念的兴起,为日本大型企业和非政府组织建立新型公私合作模式提供了机遇,如日本住友化学株式会社对“遏制疟疾伙伴关系计划”的支持^[20]。

目前,日本参与全球卫生的政府机构主要有外务省、厚生劳动省和财务省,三个部门分别负责制定日本全球卫生政策和多双边卫生合作预算、提供双边卫生技术援助、提供卫生项目官方发展援助资金,而执行单位是日本国际协力机构^[21]。

日本主要通过支持国际组织的多边途径来参与全球卫生,它是联合国儿童基金会、发展计划署和人口基金的头号捐赠国,也是世界卫生组织和全球基金的主要资助国^[22]。除美国外,日本与其他传统援助国及邻国(中国和韩国)的双边卫生合作甚少。

日本和美国于1992年签署《日美合作共同议程》,将卫生和人类发展作为其四大合作领域之一^[23]。尽管日美在参与全球卫生的方式上有所不同,但是他们共同支持创建了全球基金,并在孟加拉国、加纳和塞内加尔三个试点国家建立了美国国际开发署和日本国际协力机构的协调合作机制。2011年,日本外务省紧随美国发布了《日本全球卫生政策(2011—2015年)》,但日本在全球卫生人才储备和双边卫生合作水平上,与美国存在巨大的差距。

4 中国对非南南卫生合作策略的应对性转变

4.1 中非合作的全面蓬勃发展

冷战后,美国各届政府对非政策各有不同:老布什政府对非政策重点在于抢占前苏联遗留下的阵地和推行“美国民主”,克林顿政府强调通过经济贸易发展美非关系,小布什则将重点转向反恐和能源。这些政策服务于美国的全球战略、实用主义色彩明显、且实施手段灵活多样^[24]。总体而言,直到奥巴马政府的第二任期,美国的非洲政策对非洲的影响未能像其他重点区域那样积极。

日本的外交重点在于巩固日美同盟及经营亚太

战略,非洲并不是其对外战略的重心。然而,日本为了拓展经济权益、提升政治大国地位、增进软实力,非洲政策对其也有着特殊而重要的作用^[25]。

从美日两国近期非洲政策的转变,不难看出“中国因素”对其非洲政策指向的重要影响。

不同于美国和日本,中国与非洲有着类似的历史发展历程,在争取民族解放的过程中始终相互同情、相互扶持,结下了深厚友谊。进入新世纪以来,中非双方借助“中非合作论坛”这一交流机制,在政治上平等互信、在经济上合作共赢、文化上交流互鉴,开创了中非新型战略伙伴关系的良好局面。中国向非洲国家提供了力所能及的援助,而非洲国家也给予中国诸多有力的支持。

作为对非援助的主要途径之一,具有半个世纪历史的卫生援助是中国各个援外项目中成就最为突出的领域。自 1963 年中国向阿尔及利亚派遣第一支医疗队起,中国通过向非洲国家派遣援外医疗队、协助非洲等国家建设医院和疟疾防治中心、培训当地卫生工作者、接收留学生来华进行医学教育、为这些国家提供优质廉价的药品和医疗器械等,对非作出了巨大贡献。这些努力不仅提高了当地人民的健康水平,加快了这些国家卫生事业的发展,也极大地促进了我国和非洲国家人民之间的友谊,为中国在第三世界树立了良好的国家形象^[26]。然而,针对美日等国全球卫生战略的相继公布、对非卫生援助的再次加强,我国应在借鉴传统援助国成功与失败经验的基础上,全面、系统地评估我既往对非卫生援助项目,审慎、客观地研判未来全球卫生的发展趋势,并从自身实际出发对未来中国对非卫生策略进行规划和调整。

4.2 中国对非全球卫生政策的转变

中非未来合作充满机遇。首先,“中非合作论坛”是新兴国家对非合作机制中建立最早、迄今最为成熟和完善的交流平台。通过这一平台,中非间的磋商具有灵活性和广泛性。随着中国影响力的不断扩大,“中非合作论坛”的内涵和外延也在不断拓展,卫生领域的合作也将进一步成为双方合作的重点。其次,中非双方经济的持续增长,加速了中非之间的贸易往来。双方的市场具有互补性、非洲对医药卫生产品的大量需求,对中国的医药厂商具有巨大吸引力。再次,中国以往医药卫生体制的发展历程,其成功经验和失败教训,均值得同为处于发展阶段的

非洲国家所借鉴^[27]。最后,中非卫生合作迄今已有 50 年的历史,双方将基于以往的良好合作经验,将该领域合作进一步深化。

然而,中非卫生合作同样充满挑战。首先,除非盟外,中国与非洲次区域组织的合作不足,而这些组织可成为中国对非卫生合作的一个良好媒介。其次,由于中非在国家意识形态和国家战略目标上存在差异,且有语言障碍、文化差异、政治、经济、卫生体制的不同,中国对非卫生援助效果有限。第三,对非卫生合作主体的多元性造成政策落实与其初衷存在差距,而活跃的对非民间团体尚未与政府力量形成合力。最后,西方国家的遏制与其他新兴国家的竞争,使得未来中非卫生合作之路障碍重重^[28]。

在相当长的时期里,中国的国际战略囿于条件和能力的限制,而停留在“应招、接招、支招、出招”的阶段。随着经济的崛起,中国将承担更多国际义务,参与包括全球卫生在内的各项议程的讨论和治理,因而要抛弃“政策思维”转向“战略思维”,加强顶层设计和统筹协调,以适应中国在全球事务中的新身份和新作用^[29]。

鉴于我国对非 50 年卫生合作的历程,结合美日全球卫生战略的成败,笔者对未来中非卫生南南合作提出以下建议:

提高科学决策过程。对既往卫生合作项目进行全面、系统的评估,总结经验教训,并以此设计未来中非卫生合作项目的评价体系;支持中国全球卫生领域智库建设,加强该领域青年人才的培养,为未来中非卫生合作储备跨学科的专业人才。

借助广阔市场力量。加强政府与研究机构、企业和非政府组织的合作,借鉴美日成功的公私合作模式,共同促进中非卫生合作;中国不仅要为非洲建设医疗基础设施、提供医药卫生产品,更要为其提供可行的提高医疗卫生可及性的良策。

创新卫生援助机制。在继续保持与非各国政府良好的双边卫生合作基础上,积极通过国际多边组织加大对非援助力度;通过第三只手的力量,不仅帮助非洲国家提高健康水平,更能提高中国参与全球卫生事务的力度。

转变卫生合作形式。理顺国内涉及对非卫生合作各部门之间的关系,建立协调、统一、透明的决策和执行机制,结合我国主要的国家战略部署,尽快制定符合我国国情的全球卫生战略及中长期政策目

标,并以此作为对非卫生合作的纲领性文件。

参考文献

- [1] Hopeless Africa, the Economist.2013[2000-05-13]. <http://www.economist.com/node/333429>.
- [2] The hopeful continent. Africa rising. The Economist.2013 [2011-12-03]. <http://www.economist.com/node/21541015>.
- [3] International Monetary Fund (IMF), World economic and financial surveys. World economic outlook (67-69), Washington D. C. , 2013. <http://www.imf.org/external/pubs/ft/weo/2013/01/pdf/text.pdf>.
- [4] Raluca B. China and the US court Africa. Yale Global Online, 2013. <http://yaleglobal.yale.edu/content/china-and-us-court-africa>.
- [5] Raluca B. China and the US court Africa. Yale Global Online, 2013. <http://yaleglobal.yale.edu/content/china-and-us-court-africa>.
- [6] The White House. U. S. Strategy toward Sub-Saharan Africa. 2012. http://www.whitehouse.gov/sites/default/files/docs/africa_strategy_2.pdf.
- [7] 李安山.揭秘奥巴马非洲行:美国的非洲战略与对中国影响.《今日中国(法文版)》,2012. http://news.china.com.cn/world/2013-07/30/content_29571125.htm.
- [8] John PB,George I,Mwangi K, et al. Top five reasons why Africa should be a priority for the United States, Brookings Institution. Washington D. C. , 2013. <http://www.brookings.edu/research/reports/2013/04/africa-priority-united-states>.
- [9] Katherine B,David B,Nellie B, et al. Global Health Policy in the Second Obama Term, Center for Strategic and International Studies/Rowman & Littlefield. Washington D. C. , 2013. <http://csis.org/publication/global-health-policy-second-obama-term>.
- [10] The United States government global health initiative. Strategy documents. 2009. <http://www.cdc.gov/globalhealth/ghi/pdf/ghistrategy.pdf>.
- [11] <http://www.usaid.gov/where-we-work/africa>.
- [12] Victor C, Lucy C, Healthier AC, et al. The changing landscape of global health diplomacy, Center for Strategic and International Studies/Rowman & Littlefield. Washington D. C. , 2013. <http://csis.org/publication/changing-landscape-global-health-diplomacy>.
- [13] Eric J. Beyond investment, political engagement called for; Japan urged to play more visible role on continent. The Japan times. Tokyo, 2013. <http://www.japantimes.co.jp/news/2013/06/04/national/japan-urged-to-play-more-visible-role-on-continent/#.UwnK1bKcE3M>.
- [14] Ministry of Foreign Affairs of Japan. Yokohama Declaration 2013; Hand in hand with a more dynamic Africa. Tokyo, 2013. http://www.mofa.go.jp/region/page3e_000053.html.
- [15] Emilie G. Le Japon défend ses positions, Le Monde diplomatique, 2013. <http://www.monde-diplomatique.fr/2013/06/GUYONNET/49202>.
- [16] Benjamin S. Japan's global health diplomacy: Internationalization of public health. CSIS report, Washington D. C. , 2013. <http://csis.org/publication/changing-landscape-global-health-diplomacy>.
- [17] 夏庆杰,陈禹江.世界主要国家对非医疗援助模式分析及对中国的启示.第三届中非卫生合作论坛汇编文章,北京,2012.
- [18] Benjamin S. Japan's global health diplomacy: Internationalization of public health. CSIS report, Washington D. C. , 2013.
- [19] Rayden L, Sayako K, Osamu K, et al. Re-invigorating Japan's commitment to global health: challenges and opportunities. Lancet, 2011, 378: 1255-64.
- [20] Benjamin S. Japan's global health diplomacy: Internationalization of public health. CSIS report, Washington D. C. , 2013.
- [21] Katherine B, Haruko S, Ayaka F, et al. Japan's global health policy: Developing a comprehensive approach in a period of economic stress. Center for Strategic and International Studies/Rowman & Littlefield. Washington D. C. , 2013. <http://csis.org/publication/japans-global-health-policy>.
- [22] Benjamin S. Japan's global health diplomacy: Internationalization of public health. CSIS report, Washington D. C. , 2013.
- [23] 美国和日本政府.全球视野下美日合作共同议程,1993.
- [24] 杜小林.冷战后美国对非政策的演变、特点和趋势.现代国际关系, 2006(3): 11-15.
- [25] 罗建波.日本对非洲外交及其发展趋向.西亚非洲, 2008(11): 30-35.
- [26] 鲁新,季煦,刘继同,等.中国南南卫生合作研究系列丛书:全球卫生时代中非卫生合作与国家形象.北京:世界知识出版社,2012.
- [27] 徐建国,王洪一.新兴大国对非合作比较.中国国际问题研究所,2013. http://www.fmprc.gov.cn/zflt/chn/xsjl/xzhd_1/1/t1031530.htm.
- [28] 徐建国,王洪一.新兴大国对非合作比较.中国国际问题研究所,2013. http://www.fmprc.gov.cn/zflt/chn/xsjl/xzhd_1/1/t1031530.htm.
- [29] 上海国际问题研究所.新 10 年中国外交的 10 项战略转变倡议.2013.

The Analysis of New Practices of Sino-African Health Cooperation

Xu Ji^{1,2}, Guoping Lu³, Lina Zhao³

1. Peking University Global Health Institute, Beijing 100191, China;

2. The Ministry of Health Human Resources Development Center, Beijing 100044, China;

3. Ministry of Health and Family Planning Commission Department of International Cooperation Department, Beijing 100044, China

Abstract: Over the past 10 years, the African continent is undergoing a huge transformation. Although the region as a whole is still confronting many economic and social challenges, particularly in achieving the UN Millennium Development Goals, it is undeniable that “Africa is on the right track.” This paper systematically reviews the recent initiatives in the arena of global health made by the United States and Japan, the two major players in international health development aid and further analyzes how China will respond to those changing situation and continue to conduct pragmatic health cooperation with African countries through scientific decision-making process, comprehensive market forces, innovation in health assistance mechanism and diversity of health cooperation patterns, etc., so as to enhance the breadth and the depth of Chinese South-South health cooperation.

Key words: US and Japan; global health strategy; south-south health cooperation

第 45 届亚太会：聚焦全球健康

2013 年 10 月 26—27 日,来自近 30 多个国家和地区的 600 多名专家学者汇聚珞珈山下,召开由武汉大学承办的第 45 届亚太地区公共卫生联盟大会。为期两天的学术年会,以“全球健康”为主题展开学术研讨,此次大会是武汉大学庆祝建校 120 周年重大学术活动之一。也是武汉大学建校以来外宾人数最多、规模最大的国际性学术会议。

美国杜克大学、圣路易斯大学、田纳西大学、夏威夷大学,香港中文大学,马来西亚马来亚大学,韩国延世大学,斯里兰卡科隆坡大学,泰国玛希隆大学,印尼大学等十多所海外知名院校纷纷组团参加会议,代表人数达 600 余人。会务组共收到来自亚洲、欧洲、美洲、大洋洲等 30 多个国家和地区的 1300 多篇会议投稿,涉及全球健康领域 20 个专题。此次大会的宗旨是致力于改善亚太人民的健康生存环境和提高健康水平。会议上,通过学术交流互动与合作,联盟成员共同分享和传播最佳理论和实践经验,为改善亚太地区人民健康质量做出更多的努力和贡献。

(通讯员:刘纯)

Fostering China's Increasing Engagement in Global Health^{*}

Feng Cheng^{1,2}, Lucy Chen³, David Gold⁴, My-Thuan Tran⁴, Alex Bowles⁴

1. Tsinghua University Research Center of Public Health, Beijing 100084, China;

2. Global Health Strategies, Beijing 100022, China;

3. Beijing University Institute for Global Health, Beijing 100191, China;

4. Global Health Strategies Initiatives, New York 10010, USA

Abstract: China has been actively participating in global health issues. This paper made an overall review of China's development in both domestic and global health. China's contributions to global health are discussed in terms of foreign assistance, human resources and infrastructure, the use of drugs, political commitment, etc. The challenges China is confronting are also discussed so as to better foster China's engagement in global health.

Key words: Global Health; Foreign Assistance; South-South Collaboration; Challenges; China

1 Introduction

As China has solidified its standing as a global power, it has rapidly increased its foreign, with an estimated annual growth of 29% between 2004 and 2009^[1]. Health-focused assistance remains a small, though growing, part of China's overall assistance budget. Nonetheless, as China increasingly brings resources and innovation to support health in developing countries, it has the potential to make a significant impact on health globally.

China's efforts are part of the growing influence

of emerging economies in global health. Countries including India and Brazil with an increased focus on South-South cooperation are bringing new approaches and resources to improve the health of people worldwide. As the budgets of traditional global health donors continue to come under pressure, these efforts are increasingly important.

China is uniquely poised to advance global health efforts, drawing from its significant domestic health achievements, production of high-quality, low-cost health technologies and enormous investment in research and development. At the same time, ensuring China's potential as a global health

Received: 2014-02-22; **Revised:** 2014-02-25

^{*} Paper presented at the 45th APACPH Conference hosted by School of Public Health at Wuhan University, October, 2013.

Author: Feng Cheng, professor of research center for public health, Tsinghua University & vice president of Global Health Strategies (GHS); Lucy Chen, executive deputy director, Institute for global health, Peking University; David Gold, principal of Global Health Strategies (GHS); My-Thuan Tran, director of Global Health Strategies (GHS); Alex Bowles, senior associate of Global Health Strategies (GHS)

Corresponding Author: Feng Cheng, research center for public health, Tsinghua University & Global Health Strategies (GHS). E-mail: fcheng@globalhealthstrategies.com

partner is fully realized and continued political commitment from China's leaders is needed. The Government of China recognized in 2011 that "China has a long way to go in providing foreign aid", and promised to "optimize the country's foreign aid structure, improve the quality of foreign aid... and improve the pertinence and effectiveness of foreign aid"^[1]. International organizations and traditional global health donors can have a key role in supporting China's efforts.

Domestic Health Achievements Offer Key Lessons

China has made dramatic progress against its own public health challenges, even with a relatively low per capita GDP. The country met MDG 4 ahead of schedule, reducing child mortality from 54 per 1,000 live births in 1990 to 14 in 2012^[2]. It has achieved MDG 5 and has made progress against MDG 6. China successfully controlled and prevented a range of infectious diseases. It eliminated polio in 2000 (and swiftly dealt with re-importation of the virus in 2012), eliminated lymphatic filariasis in 2008, and nearly eliminated malaria and schistosomiasis.

China has strengthened its health system to reach both urban and rural areas. In 2009, China embarked on reforming its health sector to expand universal coverage of health services and insurance by 2020, representing the greatest expansion of healthcare coverage and access the world has ever seen.

China's domestic health progress can provide valuable models for developing countries facing similar challenges. One important factor of China's success in reducing child mortality is improving access to immunization through its National Immunization Program, along with advances in cold chain management and surveillance systems. China has begun to share its expertise through bilateral technical assistance to other developing countries facing similar challenges.

2 Quality Health Technologies and Improving Access

China's pharmaceutical industry, starting from scratch, has grown from a weak, centrally planned sector to a strong, market-oriented one. Since the Reform and Opening-up, the pharmaceutical sector has been one of the fastest growing industries. China has invested heavily in research and development and is now the second biggest investor in R&D in the world, after the United States^[3]. Chinese companies have been a source of high-quality, low-cost technologies and are increasingly bringing innovative technologies to market that could substantially improve access in developing countries.

One important example of this has been anti-malarial drugs, as China is the world's largest producer of artemisinin. Another example is Sino-implant II, a low-cost, long-acting injectable contraceptive, which has helped to drive prices down for women in countries where access to reproductive health services is limited. The Shang Ring is a low-cost male circumcision tool that can reduce the risk of HIV infection, which makes it highly suitable for low-income countries with high HIV prevalence. Both Sino-implant and the Shang Ring are awaiting WHO prequalification, which will clear the path for purchase by international agencies.

Chinese companies manufacture all 15 vaccines in its National Immunization Program, ensuring a reliable domestic supply of vaccines. In October 2013, the first Chinese-manufactured vaccine achieved WHO prequalification, marking a milestone in China's entry into the global market for vaccines. The vaccine protects people from Japanese Encephalitis, a disease that affects many poor communities across Asia. By meeting the international quality standard, the vaccine can now be purchased by international organizations such as the GAVI Alliance and UNICEF for delivery to

low-resource countries. Significantly, the Chinese manufacturer has embraced a principle fundamental to global equity known as “tiered pricing”, promising to provide the lowest prices to the poorest countries. A number of other vaccines are seeking WHO prequalification over the next few years, including oral polio vaccine, rotavirus, pneumococcal conjugate, seasonal flu and meningitis.

3 Human Resources and Infrastructure

China's health assistance is rooted in recognition of the essential role that human resources play in health, and its efforts focus on helping support sustainable health systems in low-income settings. Since 1963, China has sent more than 20,000 health workers including doctors and nurses to 42 countries in Africa and a dozen countries across Asia through its Chinese Medical Teams program^[1]. To build local capacity, China's overseas medical teams also train in-country staff.

China has historically provided assistance for much-needed health infrastructure in several developing countries including hospitals and malaria centers, and has supported pharmaceutical factories in various countries in Africa.

4 Political Commitment to Strengthen China's Global Health Efforts

Over the past year, China's government and private sector have engaged in further efforts to support health in other countries, particularly on the African continent. The Ministerial Forum on China-Africa Health Development in August brought more than 30 African health ministers and a number of global health leaders to Beijing. This Forum was the first meeting of health ministers under the Forum on China-Africa Cooperation (FOCAC), highlighting the importance of health in the future of China-Africa relations.

Participants at the meeting agreed to the *Beijing Declaration*, which identified areas where China can bring its expertise and resources to address particular health issues, such as malaria control, schistosomiasis, HIV/AIDS, reproductive health and immunization. The Declaration also highlighted efforts that could support sustainability, such as addressing health worker shortages and increasing partnerships on research and technology transfer.

5 Challenges for Global Health Efforts

One challenge is that China does not have a single overarching body that coordinates its aid. Instead, several agencies and departments in China share responsibility for China's health assistance budgets and activities. They are the Ministry of Commerce (MOFCOM), the National Health and Family Planning Commission (NHFPC), and the Ministry of Foreign Affairs (MOFA). Each ministry has different interests and priorities, and lack of coordination can inhibit efficiency, efficacy and transparency.

China's great promise as a source of health technologies is limited by continuing challenges with quality control. While most Chinese products are of high quality, doubts over quality and safety sometimes undermine their acceptance. Counterfeit or poor quality drugs produced in China and other countries threaten real harm in some instances. Resolving this issue will require addressing an interlocking set of problems including lax regulatory regimes and the role of the private sector. But the recent prequalification of the Chinese-made Japanese Encephalitis vaccine augurs well for the future.

Finally, China has traditionally conducted aid through bilateral agreements, rather than financing multilaterals such as the GAVI Alliance or the Global Fund. This aligns with many other emer-

ging economy governments, such as Brazil and India, which don't hew to standard donor-recipient frameworks but instead explore different development-assistance models. China's preference for bilateral agreements is likely to remain, although its engagement with multilaterals is expanding, including donations to UNICEF, the Global Fund and the WHO. In recent years, China has welcomed the support of international organizations such as WHO, UNAIDS, UNFPA and UNICEF in shaping China-Africa health collaboration.

This increasing engagement with international organizations and systems must also include Chinese businesses. Chinese pharmaceutical companies are still focusing almost exclusively on the domestic market. This means they will need some support to meet international standards for WHO prequalification of drugs and vaccines—a long and complex process, with language barriers a continual challenge.

6 Conclusion

China's experience in building and operating health delivery systems in low-income settings, combined with its progress in health product development and manufacturing, make it ideally placed to collaborate with various partners in improving

global public health. China's engagement in global health is a powerful force that can provide new funding and innovative technologies and approaches. By seeking to develop a coherent global health strategy, the Chinese government is demonstrating its commitment to further its influence on global health. The international community has an immense opportunity to support these efforts. To move forward, China needs to engage in global health debates, to better understand the health needs of partner countries and coordinate its own efforts more effectively. Continued advocacy can help encourage the Chinese government to address the challenges identified above, expand its engagement and align its priorities to effectively support the global community in meeting pressing health challenges.

References

- [1] Information Office of the State Council of P. R. China. China's Foreign Aid: Information Office of the State Council. 2011 [2014-02-24]. http://english.gov.cn/official/2011-04/21/content_1849913.
- [2] The World Bank. Mortality rate, under-5 (per 1,000 live births). 2013 [2013-02-24]. <http://data.worldbank.org/indicator/SH.DYN.MORT>.
- [3] Kaufman, J. IAVI Internal Strategy Paper. New York: International AIDS Vaccine Initiative, 2009.

中美两国烟草控制政策的比较研究

崔丹¹, 甘甜², 毛宗福¹, Jay E. Maddock¹

1. 武汉大学全球健康研究中心, 武汉 430071; 2. 广东省疾病预防控制中心, 广州 511430

摘要:以 WHO 烟草控制“MPOWER 策略”为框架, 比较中美两国烟草控制的政策措施, 为中国烟草控制提供借鉴。通过网络检索中美两国烟草控制政策措施的有关文献, 采用比较分析法, 对比中美两国控烟“MPOWER 策略”的主体、对象、内容及历史演变等。认为与美国相比, 中国烟草控制政策的主要问题为: ①尚未形成连续、覆盖全人口的烟草流行监测系统; ②缺乏国家级无烟法律、地方规章制度权责不明及处罚强度不够; ③戒烟帮助缺乏实效; ④烟草包装中警语标识不够明显且缺乏力度; ⑤烟草企业通过隐性及间接广告提升企业形象; ⑥烟草税率低, 不足以影响吸烟者的购买能力。

关键词:烟草控制; MPOWER 策略; 比较研究

2003 年 5 月, 第 56 届世界卫生大会通过了《烟草控制框架公约》(Framework Convention on Tobacco Control, FCTC) 以控制全球严峻的烟草流行趋势。2008 年 WHO 在其《全球烟草流行报告》中, 总结了 179 个成员国控烟履约现状和经验, 并提出了控制烟草流行的“MPOWER 策略”, 具体指监测烟草使用 (Monitor), 保护人们免受烟草烟雾的危害 (Protect), 提供戒烟帮助 (Offer), 警示烟草危害 (Warn), 确保禁止烟草广告与促销 (Enforce), 提高烟草税收 (Raise)。

2003 年 11 月, 中国政府签署了 FCTC; 2005 年 8 月, 十届全国人大常委会审议通过 FCTC。然而 2011 年, 时任中国疾病预防控制中心 (Centers for Disease Control and Prevention, CDC) 副主任杨功焕在《控烟与中国未来》指出, 中国控烟效果微弱, 吸烟率居高不下, 履约绩效得分很低。只有中国实行全面控烟, 世界才能实现 FCTC 目标^[1]。

虽然美国会并未通过 FCTC, 但作为曾经的烟草生产和消费大国, 美国全人群吸烟率由 1965 年的 42.4% 降至 2010 年的 17.3%^[2], 烟草控制成效显著。

本研究以 WHO 的扭转烟草流行系列政策——即 MPOWER 策略——为框架, 对中、美两国烟草控制政策与措施进行比较研究, 为中国烟草流行控制政策提供参考。

1 研究方法

1.1 文献检索策略

主要检索来源: ①采用“tobacco, FCTC”等关键词在 WHO 及其相关网站进行检索; ②采用“smoking, legislation”等关键词在美国 CDC 网站检索, 采用“tobacco control, smoking bans, tax, smoke-free”等关键词在 PubMed, Elsevier, Tobacco Control 中检索; ③采用“烟、吸烟”等关键词在原中国卫生部、中国 CDC 网站检索; 采用“烟草控制、政策、禁止吸烟、无烟立法、烟草包装、监测、烟草价格、烟草税”等为关键字在中国学术期刊全文数据库、中国优秀硕博学位论文全文数据库进行检索。文献检索时限为 1995—2012 年, 涉及政策及其演变性的文献, 不受时间限制。

收稿日期: 2014-01-20; 修回日期: 2014-02-20

作者简介: 崔丹, 武汉大学全球健康研究中心副教授; 甘甜, 广东省疾病预防控制中心工作人员; 毛宗福, 武汉大学全球健康研究中心主任、教授; Jay E. Maddock, 武汉大学全球健康研究中心珞珈讲座教授

通讯作者: 毛宗福, 武汉大学全球健康研究中心。E-mail: zfmiao@126.com

次要检索来源: www. smokefree. com、www. gallup. com、www. cdpca. gov、新探健康发展研究中心网站、烟草在线、百度、谷歌等,采用的主要关键词同上。

1.2 文献纳入和排除标准

(1) 纳入标准: ①研究对象为中国和/或美国的烟草控制政策措施; ②控烟指标以宏观为主, 如吸烟率、烟草销量等; ③通过搜索引擎查找到的文献资料至少能从三个不同来源证实。

(2) 排除标准: ①控烟政策措施仅作为背景资料, 无详细内容; ②研究内容偏重微观领域, 如烟草控制中着重写烟草企业发展制度、戒烟帮助中关注药物治疗等; ③相同内容以官方文献为准。

1.3 研究内容与方法

根据 FCTC 提出的 MPOWER 战略, 从 6 个方面中比较中美国家(联邦)层面、省(州)层面的烟草控制法律法规以及相关政策措施。

1.4 质量控制

搜集文献过程中, 以官方网站为首要来源; 其次为数据库中的科研文献; 第三为烟草研究相关网站; 第四为搜索引擎, 且资料至少能从三个不同来源证实。

1.5 检索结果

纳入研究的文献: ①法律文本 60 条。美国 40 条, 其中联邦级 4 条, 州级 36 条。中国 20 条, 全国性 4 条, 地方性 16 条。②研究报告 110 篇。烟草流行资料 10 篇, 世界及中国控烟报告 7 篇, 综合措施报告 7 篇, “监测”相关 6 篇, “保护免于二手烟暴露” 26 篇, “提供戒烟帮助” 18 篇, “警示烟草危害” 14 篇, “禁止烟草广告” 10 篇, “烟草税” 13 篇。

2 比较与分析

2.1 监测烟草使用

(1) 实施主体: 1964 年美国 Surgeon's General Report on Tobacco Use 报告出炉后, 人群烟草流行监测由卫生署和 CDC 共同负责, 1984 年后由美国 CDC 主要负责, 并形成专门的烟草使用监测系统; 中国由国家 CDC 负责, 但未专门设置烟草使用监测系统, 烟草使用调查多限于院校、卫生部门或特定人群^[2,3]。

(2) 实施对象: 美国大部分监测面对全人口, 也

有关关注成年人的行为危险因素监测系统(Behavioral Risk Factor Surveillance System, BRFSS)^[4]和未成年人的青少年烟草调查(Youth Tobacco Survey, YTS)等; 中国没有针对全人口的监测, 仅有针对小范围特定人群的特定调查。

(3) 烟草监测的发展: 美国的烟草监测经历了 3 个阶段。第 1 阶段是 20 世纪 60-80 年代, 以零散的烟草流行调查为主。第 2 阶段是 1985 年后, 利用美国 CDC 的全球最大电话调查系统——BRFSS, 监测全国人口的健康状况和包括吸烟在内的相关危险因素; 之后陆续出现了 YTS、TUS-CPS(Tobacco Use Supplement-Current Population Survey)等特定人群的监测系统。第 3 阶段是 1995 年后, 建立了美国烟草活动跟踪和评估系统(State Tobacco Activities Tracking and Evaluation System, STATE), 标志着专门烟草监测系统的形成。STATE 是有关实时及过去烟草使用的电子数据库, 包括行为、经济、法律法规、人口学资料、环境、健康后果和支出等^[5]。

中国的烟草监测起步晚, 1996 年和 2002 年进行过两次全国烟草流行调查, 包括成年人吸烟率、二手烟暴露率等。此外, 国家 CDC 控烟办公室还开展过: 全球成人烟草监测(Global Adult Tobacco Survey, GATS)、中央补助地方烟草控制项目和国际烟草控制政策评估调查(International Tobacco Control Policy Evaluation Project, ITC)^[6]。

在监测烟草使用领域中美两国的实施主体都确定为国家 CDC, 就实际监测情况而言, 中国尚缺乏连续、覆盖全人口、全面、常态的监测。

2.2 保护人们不接触烟草烟雾

(1) 公共场所: 美国由各州制定公共场所无烟法律。亚利桑那率先于 1973 年对吸烟场所进行限制; 1995 年《加利福尼亚州无烟工作场所法》中限制在工作场所吸烟, 1998 年在此基础上推出无烟餐厅和酒吧政策^[7]; 2002 年, 特拉华通过首条完整、全面在工作场所禁烟的规定^[8]; 北卡罗来纳作为烟草大州, 20 世纪 80 年代开始在政府办公场所禁烟, 2008 年校园禁烟, 2009 年第 1 个实现餐馆和酒吧 100% 无烟^[9]。截止 2011 年, 有 16 个州(特区)实现 100% 无烟^[10], 即所有公共场所、工作场所、餐馆和酒吧全部禁烟, 没有豁免条款。其他多数州通过了带豁免情况的禁烟法令。此外, 近年来美国还在积极推动在室外公共场所禁烟。

1991年原国家卫生部发布《公共场所卫生管理条例实施细则》规定影剧院、体育馆、医院候诊区、公共交通等候区和公共交通工具等室内禁烟;1991年全国人大通过《烟草专卖法》,列入了公共场所禁烟的条款;2011年5月1日原卫生部修订了《公共场所卫生管理实施细则》,全面规定室内公共场所禁烟,同时规定经营者有义务劝阻吸烟行为。

(2)交通工具:美国最早于1936年在密尔沃基和威斯康辛实施所有公共交通工具禁烟的规定,当时涉及的主要是公路交通工具。铁路方面,1993年美国铁路公司规定列车无烟,但允许设置“吸烟车厢”^[11]。航空领域,1973年联邦法律规定国内航班设置吸烟区和非吸烟区^[12],1988年规定不超过2小时的航线全部禁烟,1989年进一步在公共法案(101-164)中将其扩展到不超过六小时的航线^[13],2000年由总统签署法案在州内、州际及国际航班全面禁烟^[14]。

中国最早于1997年,由原国家卫生部和交通部门共同发布《关于在公共交通工具及其等候室禁止吸烟的规定》,同时制定了相应的处罚规定^[15]。

在保护人们不接触烟草烟雾方面,虽然中国出台了全国性的公共场所和公共交通工具禁烟法律法规,但仅为部委颁布,级别较低,缺乏国家级无烟法律。

2.3 提供戒烟帮助

全球约四分之一的成年人吸烟,许多烟民都希望戒烟。WHO要求各国制定政策,为希望戒烟者提供有效、成本较低的干预措施^[16]。常见的戒烟措施包括心理咨询服务和药物等戒烟干预服务。

(1)戒烟热线:美国全国戒烟热线由CDC管理,向民众提供服务,根据热线反馈不断调整服务模式^[17]。2004至2005财年,戒烟热线覆盖了美国1%的吸烟人群^[18]。此外,各州也有独立的戒烟热线;加州作为多族裔地区,戒烟热线提供亚裔、非洲裔、拉丁裔语言服务,真正实现咨询服务全覆盖^[19]。

原国家卫生部于2005年启用的公共卫生服务热线可在中国19个省(区、市)提供戒烟服务^[20];此外,中国-世界卫生组织烟草或健康合作中心也开通了独立的戒烟热线^[21]。

(2)戒烟帮助:美国卫生和公共服务部成立了吸烟和健康统筹委员会向吸烟者提供戒烟帮助。2003年“戒烟全国计划(A National Plan for Tobacco

Cessation)”建立联邦范围的戒烟福利和吸烟者基金^[22]。根据《可支付医疗选择法案》,部分州将戒烟帮助服务全部纳入Medicaid保险范畴。2005年,Medicare也将部分受益人的戒烟咨询纳入报销范围。目前,美参议院正致力于推动Medicaid和Medicare将戒烟帮助相关服务都纳入报销范围^[23]。

北京最早于1996年在22家医院开设戒烟门诊,但后来只有3家维持。其他地区的情况与此类似。2005年第18个世界无烟日,原国家卫生部呼吁有条件的医疗机构开设戒烟门诊^[24]。近年来,有人大代表呼吁将戒烟纳入医保报销范畴。

在戒烟帮助领域,中国戒烟热线未能覆盖全国、戒烟门诊数量少,社区卫生服务中心、街道医院等与居民生活接触密切的医疗单位更少^[25]。医务人员缺乏必需的知识和技能、缺乏价格低廉有效的戒烟药物。总之,在此方面,中国缺乏切实有效的戒烟帮助服务。

2.4 警示烟草危害

(1)烟草包装警示标识:美国1964年出台的《联邦贸易委员会法》中将联邦贸易委员会负责烟草包装管理;2009年《家庭吸烟预防与烟草控制法》将烟草包装的管理权交由美国食品与药品监督管理局(Food and Drug Administration, FDA)负责。中国的烟草管理部门为工业和信息化部和国家烟草专卖局,但并未明确烟草包装警示标识的管理责任。

美国1964年《联邦贸易委员会法》严格规范香烟广告图片和文字不可以暗示或明示对健康有好处;1965年《联邦香烟包装和广告法案》要求香烟包装上注明“注意:吸烟可能有害健康”;1984年《全面吸烟教育法案》要求香烟包装中需轮流出现四类警告烟草危害的标签;1986年的“Comprehensive Smokeless Tobacco Health Education Act”要求无烟烟草包装中轮流出现三类烟草有害的警示语^[33];2009年《家庭吸烟预防与烟草控制法》将上述警示语提高至9条,且警示语标签需出现在包装的前面和侧边的顶部,每个标签都要覆盖50%的面积,“WARNING”为字体清晰的17号字,为达到明显对比,警语为黑字白底或白字黑底,还需印制彩色的烟草危害图片^[26]。

1983年中国国务院发布《烟草专卖条例》,规定卷烟包装需标明焦油含量及“吸烟有害健康”^[27]。2009年国家烟草专卖局在《中华人民共和国境内卷

烟包装标识的规定》中要求禁止使用“保健”、“柔和”等误导性语言,必须轮换使用 2 组警示语,警示语须位于包装盒正面和背面,面积不小于所在面的 30%,字体和底色应有一定色差,中文字高度不小于 2mm,英文不得大于中文^[28]。2011 年国家烟草专卖局在《关于进一步加大卷烟包装警语标识力度的通知》中将上述要求修订为字体和底色应有明显色差,中文字体高度不小于 4mm^[29]。

在警示烟草危害领域,中国对烟草包装并未要求展示真实图片,且对烟草危害警示语的严厉程度、印刷色差、字体大小等的要求也较弱和模糊,不足以通过烟草包装对烟民起到警示作用。中国的烟草管理部门同时也负责烟草专卖,因此不可能出台影响烟草销售的规定。

(2)反烟宣传:美国反烟运动组织者包括政府卫生部门及非政府组织(Non-governmental Organization, NGO)。政府卫生部门主要指美国 CDC 以及各州卫生部门,其中美国 CDC 主要提供指南、培训、信息等,具体活动一般由社区展开。NGO 包括传统基金会等社会团体。

中国组织反烟运动的政府部门主要是各级 CDC,主要职责是在国家 CDC 指导下结合每年世界无烟日主题,制定计划、组织宣传。中国的 NGO 包括控制吸烟协会、新探健康研究中心等,影响力还很薄弱。

在警示烟草危害领域,中国缺乏可操作性强的烟草警示法规,使得烟草警示不足以对烟民形成警示作用。中国的反烟宣传从组织者和效果来看,呈现出各自为政、片段化的特点,难以撼动吸烟文化。

2.5 确保禁止烟草广告、促销和赞助

(1)管理部门:美国 1985 年后由美国联邦贸易委员会负责管理烟草广告、促销和赞助,2009 年《家庭预防吸烟和烟草控制法》颁布后交由 FDA 负责;中国由国家工商行政管理局负责监管上述行为。

(2)禁止烟草广告、促销和赞助具体规定:美国 1969 年《公共卫生香烟使用条例》规定由司法部负责禁止在电视和广播中播放烟草广告;1986 年的“Comprehensive Smokeless Tobacco Health Education Act of 1986”禁止广播和电视节目里面播放无烟烟草广告;1998 年四大烟草公司和各州签署的“Master Settlement Agreement”禁止烟草企业在户外及公共交通工具上刊登烟草广告,禁止发放烟草

制品的样品、禁止烟草企业的赞助活动、禁止烟草企业对体育场馆等的冠名权以及限制在电影、电视节目和游戏录像中出现烟草制品^[30]。

中国国家工商管理总局 1996 年依据《广告法》颁布《烟草广告管理暂行办法》,禁止利用广播、电视、报纸、期刊发布烟草广告;禁止在各类等候室、影剧院、会议厅堂、体育比赛场馆等公共场所设置烟草广告;禁止利用广播、电视、电影节目以及报纸、期刊的文章变相发布烟草广告;禁止烟草企业冠名活动时不得通过广播、电视、电影等发布带有冠名的广告^[31]。但对户外广告没有限制,对间接广告没有明确定义,没有限制促销和赞助等行为^[32]。

(3)监管效果:中美两国虽然均有法律法规禁止烟草广告、促销和赞助,但烟草企业的上述行为并未完全禁止。美国的调查显示,在 1995-1999 年间,烟草公司共赞助了至少 2 733 项事件、项目或组织,总金额超过 3.65 亿美元^[33]。中国电视、广播、广告牌中仍有对烟草企业文化的间接宣传以提高企业在群众中的形象,如“鹤舞白沙、我心飞翔”、“山高人为峰”等。

在禁止烟草广告、促销和赞助领域,中国的法律法规还缺乏盲区,间接广告、隐性广告仍不时可见,且这些领域的研究也较少,缺乏充分、准确的数据。

2.6 提高烟草税

美国对烟叶不征收专门税,主要的烟草税是消费税和销售税,其中消费税影响最大。联邦政府从 1863 年、州政府从 1921 年开始对卷烟征收消费税,后来项目与范围逐渐扩大,税率不断提高^[34]。根据 2011 年第 4 季度的统计,美国有 7 个州的消费税低于 0.500 美元,14 个州在 0.500~0.999 美元,8 个州在 1.000~1.499 美元,7 个州在 1.500~1.999 美元,15 个州大于等于 2.000 美元^[35]。

中国对烟草制品征收的消费税既有从价税,如雪茄和烟丝;也有既从价又从量的复合税,如卷烟。中国当前对烟草行业开征的所有税种,都与各地财政利益密切相连。1994 年《消费税暂行条例》规定烟类消费税征收从价税,甲类卷烟税率是 45%,乙类卷烟和雪茄是 40%,同年 4 月甲类税率调整为 40%。2009 年财政部和税务总局调整了烟草制品消费税计税价格、提高了税率,将甲、乙类香烟的划分标准由 50 元提高至 70 元,甲类香烟消费税由 45%调整为 56%,乙类香烟由 30%调整为 36%,雪

茄由 25% 调整为 36%, 在卷烟批发环节加征从价税^[29]。调整后, 烟草税由占售价的 36% 变为 41%^[36]。

在提高烟草税收领域, 中国烟草税一直较低。中国烟草消费税的提高与人均消费增长基本同步, 可见消费税并未对抑制烟草消费起到显著作用。为实现控烟的目的, 烟草消费税的提高幅度应明显高于居民消费能力的增长^[25]。

3 结论

中美两国在制定和实施控烟政策、措施方面都做了大量的工作。两国均根据本国国情制定出相应的政策法规和具体措施, 因而不能完全类比, 但许多控烟的理念和管理措施、技术措施应是相通的, 从这个角度说, 美国在戒烟理念、创新制度、管理模式、监控模式等方面都有值得中国学习和借鉴。

致谢 李十月教授, 王全副教授和王培刚博士等参与讨论和提出宝贵修改意见, 夏威夷大学公共卫生学院提供了实地了解美国控烟政策与执行的实践考察机会。

参考文献

[1] Centers of Disease Control and Prevention. Behavioral Risk Factor Surveillance System.[2011-11-20].<http://www.cdc.gov/brfss/>.

[2] CDC. Prevalence and trends data tobacco use-2010 Adults who are current smokers. Office of Surveillance, Epidemiology, and Laboratory Service. [2011-11-20]. <http://apps.nccd.cdc.gov/BRFSS/list.asp?cat=TU&yr=2010&qkey=4396&state=All>.

[3] 郭宁晓.广州市成年吸烟者吸烟知识态度行为前瞻性研究.北京:中国疾病预防控制中心慢性非传染性疾病预防控制中心,2009:16-17.

[4] Centers of Disease Control and Prevention. Behavioral Risk Factor Surveillance System.[2011-11-20].<http://www.cdc.gov/brfss/>.

[5] Centers for Disease Control and Prevention. Data Source/Methodology. Office of Surveillance, Epidemiology, and Laboratory Service. [2012-01-23]. http://apps.nccd.cdc.gov/statesystem/help/help_methodology.aspx.

[6] 中国疾病预防控制中心控烟办公室.监测评估概述.[2011-12-12].http://www.notc.org.cn/jcpg/gs/200912/t20091215_

6830.htm.

[7] David WC, Philip B. Smoke free laws and bar revenues in California-the last call. Health Economics. 2005 (14): 1273-1281.

[8] Centers for Disease Control and Prevention. State smoke-free laws for worksites, restaurants, and bars - United States, 2000-2010. MMWR Morbidity and Mortality Weekly Report, 2011, 60(15): 472-475.

[9] Michelle D, Richard LB, Stanton AG. Chipping away at tobacco traditions in tobacco country: tobacco industry political influence and tobacco policy making in North Carolina 1969-2011. Center for Tobacco Control Research and Education School of Medicine. 2011.

[10] Global Smoke-Free Partnership. 禁烟进展:全球无烟法律综述. [2012-02-14]. <http://www.globalsmokefreepartnership.org>.

[11] Smoke-free Transportation Chronology.[2012-02-23].<http://nosmoke.org/document.php?id=334>.

[12] 唐琼,陈知.《2010年上海市公共场所控烟状况》白皮书发布. 人民代表网. [2012-03-03]. <http://www.rmdbw.gov.cn/2011/0419/52674.html>.

[13] Centers of Disease Control and Prevention.[2011-10-21]. Legislation. http://www.cdc.gov/tobacco/data_statistics/by_topic/policy/legislation/.

[14] The Settling States. Master Settlement Agreement.

[15] 全国爱卫会/卫生部/铁道部等发布《关于在公共交通工具及其等候室禁止吸烟的规定》.[2011-09-17]. www.notc.org.cn/zcfg/fzjcyw/201002/t20100202_6402.html.

[16] 李伟霞.上海市公共场所被动吸烟现状研究.上海:复旦大学,2010.

[17] North American quit line consortium. Who calls quit lines in the United States? 2010:1-3.

[18] 国家烟草专卖局.中国烟草总公司关于进一步加大卷烟包装警示语标识力度的通知.[2012-03-02].http://www.tobacco.gov.cn/html/49/3829706_n.html.

[19] California Smokers' Helpline. [2012-03-12]. <http://www.californiasmokershelpline.org/>.

[20] 全国公共卫生公益热线.12320,您的健康生活好朋友.[2012-02-27].<http://www.12320.gov.cn/rexian/rxjs.jsp>.

[21] 北京卫生信息网.戒烟热线将大力推广.[2012-03-12].<http://www.bj12320.org/NewsView.aspx?NewsID=20073>.

[22] A national action plan for tobacco cessation: preventing 3 million deaths, helping 5 million smokers quit.[2012-02-01].http://www.ctri.wisc.edu/Researchers/researchers_national_action_plan.htm.

[23] American lung association. Providing federal coverage for cessation services. [2011-12-02]. <http://www.lung.org/stop-smoking/tobacco-control-advocacy/federal/cessation-coverage.html>.

[24] 中华人民共和国卫生部.开展第十八个世界无烟日活动.[2012-12-06]. <http://www.moh.gov.cn/publicfiles/business/html->

- files/wsb/pzcd/200804/21150.htm.
- [25] 杨小丽,刘红岭,沈成凤,等.我国城市各医疗机构开展戒烟服务现况调查.中国公共卫生,2004(10):1258-1259.
- [26] Public law 111-31-June 22,2009. Family smoking prevention and tobacco control act. 2009.
- [27] 中华会计网校.中华人民共和国烟草专卖法.[2012-03-02].http://www.chinaacc.com/new/63/73/154/2006/5/zh8753820162560021167-0.htm.
- [28] 国家烟草专卖局.中华人民共和国境内卷烟包装标识的规定.[2014-03-16].http://www.tobaccochina.com/law/nation/wu/20084/20084153948_297463.shtml.
- [29] 中国烟草总公司.关于进一步加大卷烟包装警语标识力度的通知.[2014-03-16].http://www.catcprc.org.cn/index.aspx?menuid=4&type=articleinfo&lanmuuid=14&infoid=200&language=cn.
- [30] The Settling States. Master Settlement Agreement.
- [31] 国家工商行政管理局.国家工商行政管理局关于《烟草广告管理暂行办法》修改意见.[2012-03-02].http://www.saic.gov.cn/fldyfbzdjz/zcfg/xzfg/200909/t20090927_71295.html.
- [32] 卫生部 2006 发布会. [2012-03-02].http://www.gov.cn/xwfb/2006-05/30/content_295343.htm.
- [33] N Jennifer R, Michael S. Use of corporate sponsorship as a tobacco marketing tool: a review of tobacco industry sponsorship in the USA, 1995-1999. Tobacco Control. 2001(10): 239-246.
- [34] 江世贵,毕功兵.美国烟草税制之考察.中国烟草,1996(9).
- [35] CDC. Legislation-excise tax cigarette.[2012-03-02].http://apps.nccd.cdc.gov/statesystem/ComparisonReport/ComparisonReports.aspx?TopicID=600&MeasureID=643#Report-Detail.
- [36] WHO.2011 世界卫生组织烟草流行报告.日内瓦:世界卫生组织出版处.2012:104-105.

Comparative Research on Tobacco Control Policy between USA and China

Dan Cui¹, Tian Gan², Zongfu Mao¹, Jay E. Maddock¹

1. Wuhan University Global Helth Institute, Wuhan 430072, China;

2. Guangdong Center for Disease Control and Prevention, Guangzhou 511430, China

Abstract: This article compared the policy and measures of tobacco control between China and USA according to the MPOWER strategy of WHO and tried to find the experiences and advices for tobacco control in China. Comparing the differences between China and USA in responsible management, managed objects, managed content and historical development according to the MPOWER strategy, we found 5 important problems of tobacco control in China by searching the information of policy and measures of tobacco control in China and USA on the web. Firstly, there had not been a continuous, national-wide monitoring system for tobacco prevalence. Secondly, there was no law for smoke free in the national level. The local by-law was not clear and with a lighter punishment. Thirdly, there was no effective help for quitting smoking. Fourthly, the health warnings showed on cigarette packaging were not obvious and the sentence was not serious enough. Fifthly, tobacco enterprise enhanced their corporate image through the recessive and indirect advertisement. Sixthly, the tobacco tax was too low to reduce the tobacco consumption.

Key words: Tobacco control; MPOWER Strategy; comparative research

Public Objections to Environmental Tobacco Smoke among Adults in Hawaii

Miaoxuan Zhang^{1,2}, Rebekah Rodericks¹,
Stephanie Lee¹, Jay E. Maddock^{1,2}

1. University of Hawaii at Manoa Office of Public Health Studies, Honolulu 96822, USA;

2. Wuhan University Global Health Institute, Wuhan 430071, China

Abstract: Creating smoke free environment can reduce the harmful effect of tobacco smoke for both smokers and non-smokers. Initiating behaviors to avoid secondhand smoke may be a good way to promote or encourage a smoke free environment. Binary logistic regression was used to analyze a random digit-dialed telephone survey with 3,626 adult residents of Hawaii. Current smokers were the least likely to object to environmental tobacco smoke from both strangers and friends. Among former smokers and non-smokers, significant predictors of asking strangers not to smoke around them were: being Native Hawaiian and Filipino, good general health status, lower household income, younger age, positive social norms, disagreeing that it is okay for people to smoke in outdoor public places, and having children. Similarly, statistically significant predictors of avoiding secondhand smoke from a friend was being Native Hawaiian or Filipino, lower household income, younger age, negative attitudes towards smoking, and having children. This study indicates that changes in people's psychosocial constructs toward secondhand smoke may be important to create smoke free environments.

Keywords: Secondhand smoke; hawaii; smoke free polices

1 Introduction

The World Health Organization (WHO) predicts that by 2030, tobacco will be responsible for more than 8 million deaths worldwide each year^[1]. This is more than tuberculosis, HIV/AIDS, and malaria combined^[1]. Even among non-smokers, exposure to secondhand smoke has a broad range of serious health consequences^[2]. Secondhand smoke exposure increases the risk of lung cancer,

stroke and coronary heart disease^[2]. In the United States, secondhand smoke causes about 3,400 lung cancer deaths and 46,000 heart disease deaths each year^[3]. Tobacco is responsible for an estimated 430 cases of sudden infant death syndrome, 24,500 low-birth-weight babies, 71,900 pre-term deliveries and 200,000 episodes of childhood asthma annually in the United States^[3]. The only way to fully protect individuals from the harmful effects of secondhand smoke is to create 100% smoke-free environments^[4].

Received: 2014-02-11; **Revised:** 2014-02-22

Author: Miaoxuan Zhang, research staff of office of Public Health Studies, University of Hawaii at Manoa; Rebekah Rodericks, junior faculty of Office of Public Health Studies, University of Hawaii at Manoa; Stephanie Lee, student of Office of Public Health Studies, University of Hawaii at Manoa; Jay E. Maddock, professor of Office of Public Health Studies, University of Hawaii at Manoa

Corresponding Author: Jay E. Maddock, Office of Public Health Studies, University of Hawaii at Manoa. E-mail: jmaddock@hawaii.edu

Twenty-two percents (22%) of the world's population, aged 15 and older, are smokers. Non-smoking is becoming the standard pattern of behavior and secondhand smoking exposure has also decreased in recent years^[5]. The decrease in exposure to secondhand smoke over the last 20 years is due to the growing number of laws banning smoking in work places and public places, an increase in the number of households and residences that enforce smoke-free rules, and a decrease in adult and youth smoking rates^[6].

In Hawaii, between 2001 to 2006, the proportion of people living in homes where smoking is not allowed increased from 76% to 86% and the percentage of adults who do not allow smoking in their family cars increased from 78% to 88%^[7]. Initiating behaviors to avoid secondhand smoke may be a good way to promote or encourage a smoke free environment. One method is to directly ask smokers not to smoke around them. However, not everyone is comfortable enough to confront a stranger to request this. Lin and other researchers have studied contributing factors associated with avoidance of secondhand smoke and found that self-efficacy was the strongest factor associated with avoidance of secondhand smoke^[8]. Studies have shown that knowledge, attitude, gender, family smoking behavior, and self efficacy predict avoidance of secondhand smoke^[9,10]. However little is known about asking strangers versus friends and family members to avoid smoking. It is important to note that a friend and a stranger play different social roles and may have different predictors of behavior. The goals of this study were to: assess the prevalence of smoke free policies in households and vehicles in Hawaii; assess the prevalence of secondhand smoke avoidance behavior when the smoker is a known friend or a stranger; and to understand the predictors of secondhand smoke avoidance behavior of strangers and friends among Hawaii residents.

2 Methods

2.1 Data collection

Data for this study were collected as part of the ongoing evaluation of the Healthy Hawaii Initiative, a statewide social-ecological program designed to increase physical activity, improve nutrition and reduce tobacco use among the residents of Hawaii^[11]. In 2011, a cross-sectional random digit-dialed telephone survey was conducted among Hawaii residents aged 18 to 54. Over the course of the year, 15,108 adults were contacted by telephone. Among these, 3,626 residents aged 18 to 55 completed the telephone survey. This research included 1,840 landline-based surveys and 1,786 cell phone based surveys. In this study, *West-Var5.1* was used to generate weights. The weighting variables were age, gender, household size, and extent of cell phone use (i. e. cell only, landline only, cell majority, landline majority). All data reported in this study was weighted using these variables.

2.2 Measures

2.2.1 Demographics

Participants were asked a series of demographic questions, including age, gender, marital status, education, income, ethnic identification, general health status and number of household members. The presence of children in the household was assessed by subtracting the number of members aged 18 years and older from the total number of people in the household. For ethnic identification, "Caucasian" and "Portuguese" were categorized as "White," while "Chinese," "Japanese" and "Korean" were classified as "East Asian." For marital status, "married" and "not married but living with partner" were identified as "Not single." "Widowed," "Separated," "Divorced" and "Never married" were identified as "Single".

2.2.2 Secondhand Smoke Avoidance

Participants were asked if in the past three

months, they had asked a stranger, friend or someone they know not to smoke around them. Responses to each of the three questions were either yes or no.

2.2.3 Smoking-Related Attitudes

Participants were asked several questions to assess their attitudes and beliefs about smoking.

(Table 1). Their responses were categorized according to a 5-point scale (1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree). For the analysis, the responses were dichotomized into two categories, agree or disagree, and excluded the neutral response.

Table 1 Public Objections to Environmental Tobacco Smoke from strangers and friends by smoking status

	N	%	Asking strangers	χ^2	P	Asking friends	χ^2	P
Total	3626	100	22.6			29.1		
Smoking status								
Current smoker	599	16.6	18.3	7.510	0.023	20.3	26.977	<0.001
Former smoker	759	21.0	23.8			31.0		
Never smoker	2258	62.4	23.3			30.9		

2.2.4 Smoke free polices in homes and cars

Participants were asked “which statement best describes how smoking is handled inside your home?” Having a smoking free policy at home was indicated by the participant stating that “Smoking is not allowed anywhere inside my home.” Participants were categorized as not having a smoke free policy if they chose either of the following statements, “Smoking is allowed in some places or some times,” or “There are no rules about smoking inside my home.”^[11] Participants were asked to indicate which statement best described how smoking is handled in their cars. A smoke free policy in cars was identified if the participant said, “No one is allowed to smoke in my car.” Participants were categorized as not having a smoke free polices in cars if they chose any of the following three statements, “Only special guests are allowed to smoke in my car,” “People are allowed to smoke in my car if the windows are open,” or “There are no rules about smoking in my car.” Participants who said that they did not have a car were treated as missing^[11].

2.2.5 Smoking Status

Current and former smokers were identified if

they responded “Yes” to the question, “Have you ever smoked 100 cigarettes in your entire life” and responded “Yes” or “No” to the question, “Do you currently smoke tobacco?” respectively. Never smokers were identified if they answered “No” to both of the questions. Former smokers answered yes to the first question and no to the second.

2.2.6 Data analysis

Data were analyzed using SPSS 20.0 for Windows. In the descriptive analysis, chi-square tests were used to test for associations between secondhand smoke avoidance behavior from strangers and friends, demographic factors and smoking variables. Logistic regression was used for the binary analysis of secondhand smoke avoidance behavior from strangers. The full model consisted of all significant variables from the chi-square analyses, including ethnicity, self-reported general health status, education, income, marital status, gender, age, the presence of children in the home, the belief that people should not smoke in outdoor public places, the beliefs that all homes and cars in Hawaii should be smoke free, that secondhand smoke seriously harms non-smokers, and the social norms that most of my friends (or people in my commu-

nity) think smoking is disgusting.

3 Results

Description of Study Participants

The average age of participants was 36.1 years (S. D. = 11.0 years) and 50.1% participants were male. Four ethnic groups composed 79.1% of the sample: White (30.8%), Native Hawaiian (12.6%), Filipino (12.7%) and East Asian (23.0%). Educational attainment was high, with 28% having a high school degree and 67.6% having some college/ college degree. Less than half of respondents (36.6%) reported the presence of children in the household. For marital status, half of participants (50.1%) were married or not married but living with parent. More than half (80.4%) of the participants have a smoke free policy in home, and 80% of the participants have a smoke free policy in their cars. Almost all participants (90.9%) participants agreed second hand smoke seriously harms non-smokers and 86% said it is not okay to smoke indoors. More than half (60%) of participants agree that all homes and cars in Hawaii should be smoke free. The composition of participants by smoking status was 16.6% current smoker, 21.0% former smoker and 62.4% never smoker. Table 1 displays the frequency of objection of environmental tobacco smoke by strangers and friends by smoking status. Current smokers were the least likely to object to both stranger and friends smoking around them.

Overall, 22.6% of the respondents have asked a stranger not to smoke around them in the past three months, and 29.1% of the respondents have asked someone they know not to smoke around them in the past three month. Additionally, 75.2% of those who avoided secondhand smoke from a stranger also avoided secondhand smoke from a friend. Similarly, 58.4% of those with avoided secondhand smoke from friend also avoided secondhand smoke from strangers. Table 2 displays correlates of

public objections to smoke hand smoke exposure.

Table 3 presents the odds ratios (OR), and associated 95% confidence intervals (CI), and *P* value from the final logistic regression model assessing objection to secondhand smoke from a stranger among former and never smokers.

Table 4 presents the OR, and associated 95% CI, and *P* value from the final logistic regression model assessing objection to secondhand smoke from a friend among former and never smokers.

4 Discussion

This study found that 80.4% of Hawaii residents have a smoke free policy in their home, which is similar to the prevalence reported by the 2011 Hawaii State BRFSS (82.7%)^[12]. The study also found that 80% of Hawaii residents have a smoke free policy in cars, which is similar to the prevalence reported by the 2011 Hawaii State BRFSS (78.6%)^[13]. This study was the first to report that 22.6% of the Hawaii residents avoided secondhand smoke from strangers and 29.1% of residents avoid secondhand smoke from friend in the past three months. Former and never smokers are of particular interest because they are more likely to influence social norms around secondhand smoke exposure. They are the largest group people reporting objection to secondhand smoke. However, most people still do not ask smokers not to smoke around them. Univariate analysis found that correlates of avoiding secondhand smoke behavior varied somewhat between a stranger and a friend. Correlates in common included ethnicity, general health status, marital status, education level, household income, age. Most of their friends think smoking is disgusting. Most of the people in their community think that smoking is disgusting, it is okay for people to smoke in indoor public places, all homes and cars in Hawaii should be smoke free, and children in the home.

Table 2 Correlates of public objections to environmental tobacco smoke

	N	From stranger				From friends			
		N	%	χ^2	<i>P</i>	N	%	χ^2	<i>P</i>
Total	3017	705	23.4			929	30.9		
Ethnicity									
White	949	204	21.5	110.519	<0.001	244	25.7	110.003	<0.001
Native Hawaiian	358	126	36.1			155	44.3		
Filipino	365	119	32.6			169	46.4		
East Asian	734	87	11.9			162	22.1		
Other	600	165	27.5			195	32.4		
General Health									
Excellent	518	162	31.3	24.388	<0.001	155	29.9	10.171	0.038
Very good	940	202	21.5			294	31.3		
Good	1035	216	20.9			309	29.9		
Fair	385	94	24.9			139	36.9		
Poor	133	29	21.8			32	23.9		
Marital status									
Not single	1512	317	21.0	10.290	0.001	433	28.6	7.234	0.007
Single	1502	388	26.0			496	33.2		
Education									
High school or less	846	256	30.5	33.6	<0.001	347	41.5	62.408	<0.001
College or less	1714	350	20.4			465	27.1		
Grand school	450	95	21.2			113	25.1		
Household income									
≤ \$ 24,999	527	189	36.4	65.888	<0.001	223	43.1	73.254	<0.001
\$ 25,000~\$ 59,999	847	200	23.6			286	33.8		
\$ 60,000~\$ 99,000	624	112	17.9			164	26.3		
≥100,000	662	126	19.0			142	21.5		
Gender									
Male	1456	306	21.0	9.156	0.002	444	30.5	0.190	0.663
Female	1562	399	25.7			485	31.2		
Age									
18~34	1391	408	29.4	50.255	<0.001	532	38.3	66.733	<0.001
35~54	1627	297	18.4			396	24.5		
I think smoking is disgusting									
Disagree	218	48	22.0	0.572	0.449	68	31.2	0.198	0.656
Agree	2553	618	24.3			831	32.7		
Most of my friends think smoking is disgusting									
Disagree	451	142	31.6	14.039	<0.001	171	37.9	8.721	0.003
Agree	2112	487	23.2			647	30.8		
Most of the people in my community think that smoking is disgusting									
Disagree	459	131	28.6	6.781	0.009	170	37.0	8.504	0.004
Agree	1769	401	22.8			527	29.9		
Smoke free polices in home									
Yes	2512	595	23.7	0.506	0.477	773	30.8	0.054	0.816
No	495	110	22.2			155	31.3		
Smoke free polices in car									
Yes	2444	572	23.4	0.202	0.653	783	32.0	11.816	0.001
No	393	88	22.4			92	23.4		
It is okay for people to smoke in indoor public places									
Agree	337	73	21.7	0.915	0.339	75	22.3	14.386	<0.001
Disagree	2607	624	24			843	32.4		
It is okay for people to smoke in outdoor public place									
Agree	1561	292	18.7	50.249	<0.001	404	25.9	43.004	<0.001
Disagree	1228	369	30.3			457	37.5		
All homes and cars in Hawaii should be smoke free									
Agree	1607	444	27.8	13.830	<0.001	609	38.1	51.808	<0.001
Disagree	973	206	21.2			237	24.4		
Second hand smoke seriously harms no-smokers									
Agree	2675	614	23.0	13.564	<0.001	853	31.9	3.532	0.060
Disagree	222	73	34.1			55	25.7		
Children in home									
No	1751	391	22.5	4.835	0.028	505	29.0	19.000	<0.001
Yes	1028	269	26.1			380	37.0		

Table 3 Logistic regression model for asking a stranger not to smoke around you among former and never smokers

N=1517		OR	95% CI	P
Ethnicity				
	White	1		
	Native Hawaiian	2.034	1.277-3.239	0.003
	Filipino	2.880	1.873-4.428	<0.001
	East Asian	0.732	0.488-1.098	0.132
	Other	2.521	1.741-3.652	<0.001
General Health				
	Excellent	1		
	Very Good	0.646	0.438-0.954	0.028
	Good	0.507	0.342-0.752	0.001
	Fair	0.792	0.493-1.271	0.334
	Poor	1.188	0.528-2.674	0.678
Household income				
	≤ \$ 24,999	1		
	\$ 25,000~ \$ 59,999	0.323	0.225-0.464	<0.001
	\$ 60,000~ \$ 99,000	0.367	0.243-0.553	<0.001
	≥ \$ 100,000	0.527	0.358-0.775	0.001
Age				
	18~34 years	1		
	35~54 years	0.503	0.383-0.661	<0.001
Most of the people in my community think smoking is disgusting				
	Disagree	1		
	Agree	1.504	1.044-2.166	0.028
It is okay for people to smoke outdoor public place				
	Disagree	1		
	Agree	0.452	0.345-0.594	<0.001
Children in home				
	No	1		
	Yes	1.455	1.095-1.933	0.010

Table 4 Logistic regression model for asking a friend not to smoke around you among former and never smokers

N=1517		OR	95% CI	P
Ethnicity				
	White	1		
	Native Hawaiian	2.163	1.386-3.375	0.001
	Filipino	2.419	1.612-3.628	<0.001
	East Asian	0.893	0.623-1.281	0.538
	Other	1.436	0.999-2.063	0.050
Household income				
	≤ \$ 24,999	1		
	\$ 25,000~ \$ 59,999	0.532	0.375-0.755	<0.001
	\$ 60,000~ \$ 99,000	0.569	0.385-0.841	0.005
	≥ \$ 100,000	0.472	0.321-0.696	<0.001
Age				
	18~34 years	1		
	35~54 years	0.572	0.441-0.743	<0.001
It is okay for people to smoke outdoor public place				
	Disagree	1		
	Agree	0.642	0.495-0.833	0.001
All homes and cars in Hawaii should be smoke free				
	Disagree	1		
	Agree	1.663	1.244-2.223	0.001
Do you have smoke free policies in your car				
	Yes	1		
	No	1.792	1.160-2.769	0.009
Children in home				
	No	1		
	Yes	1.407	1.068-1.854	0.015

In binary logistic regression analyses of former and never smokers, statistically significant predictors of avoiding secondhand smoke from a stranger were Native Hawaiian and Filipino ethnicities, very good and good self-reported general health status, lower household income, younger age, agreeing that most of the people in my community think smoking is disgusting, disagreeing that it is okay for people to smoke in outdoor public places, and having children. Similarly, statistically significant predictors of avoiding secondhand smoke from a friend included being Native Hawaiian or Filipino, lower household income, younger age, disagreeing that it is okay for people to smoke in outdoor public places, agreeing all homes and cars in Hawaii should be smoke free, and having children.

4.1 Demographic and social-economic status

Filipinos and Native Hawaiians, lower household income, and younger age were predictors for objecting to secondhand smoke from both strangers and friends. According to 2011 Hawaii State Department of Health data, Filipino males have the highest smoking rate in Hawaii (25.3%), followed by Native Hawaiian females (23%)^[12]. Individuals with lower incomes and/or education, the unemployed, the unmarried, and young people report the highest smoke rates^[12, 14]. People from demographic groups with higher smoking rates are more likely to have had a greater chance of being exposed to secondhand smoke, thus, also making them more likely to ask a smoker (either a stranger or friend) not to smoke around them. Dillon's research also showed that young women in particular, were comfortable asking anyone to stop smoking because they felt they were entitled to be free from secondhand smoke exposure. However, many other young women said they were not at all comfortable asking someone to stop smoking near them due to social constraints^[15].

4.2 Smoking related-attitude and social variables

Those who agree that most of the people in their community think that smoking is disgusting

and disagree that people should smoke in outdoor public places were more likely to ask a stranger not to smoke around them. Those who disagree that it is okay for people smoke in outdoor public places, agreed that all homes and car in Hawaii should be smoke free, and had a smoke free policy in their car were more likely to ask friends not to smoke around them. These results show that people who want to create smoke free environments are more likely to ask others, either strangers or friends, not to smoke around them. This can also be supported by other studies that suggest attitude can be a predictor of an individual's behavior^[10, 16, 17], and a more positive attitude toward avoiding secondhand smoke is a prerequisite for successful secondhand smoke avoidance^[8]. An encouraging finding is that the presence of children in the household was linked to a greater likelihood of avoiding secondhand smoke from both strangers and friends.

4.3 Limitations

The low response rate may have affected the results. Caution should be used in generalizing these findings to the entire state of Hawaii. Secondly, this study was based on a telephone survey, excluding Hawaii residents without a phone. Survey questions only included questions regarding secondhand smoke avoidance behavior, and did not include secondhand smoke exposure questions. Thus, it is possible that respondents who indicated that they did not ask others not to smoke were not exposed to secondhand smoke at all.

Acknowledgements

This study was funded by the Hawaii Tobacco Settlement Special Fund through a contract from the Hawaii Department of Health to Dr. Maddock.

References

- [1] World Health Organization. Report on the global epidemic.

- Warning about the dangers of tobacco. [2012-07-23].http://whqlibdoc.who.int/publications/2011/9789240687813_eng.pdf.
- [2] Brennan P, Buffler PA, Reynolds P, et al. Secondhand smoke exposure in adulthood and risk of lung cancer among never smokers: A pooled analysis of two large studies. *International Journal of Cancer*, 2004, 109:125-131.
- [3] Joaquin B, Stanton AG. Cardiovascular effects of secondhand smoke nearly as large as smoking. *American Heart Association Journals*, 2005, 111:2684-2698.
- [4] McClure LA, Murphy HL, Roseman J, et al. Regional and racial differences in smoking and exposure to secondhand smoke: the reasons for geographic and racial differences in stroke (REGARDS) study. *Preventing Chronic Disease*, 2011, 8:1-8.
- [5] Jefferis BJ, Lowe GDO, Lawlor DA, et al. Secondhand smoke exposure assessed using serum cotinine: associations with myocardial infarction, stroke and cardiovascular risk factors in adult men and women. *Journal of Epidemiology and Community Health*, 2009, 63:92.
- [6] Maddock JE, Marshall CS, Nigg CR, et al. Development and first year results of a psychosocial surveillance system for chronic disease related health behaviors. *Californian Journal of Health Promotion*, 2003, 1:54-64.
- [7] World Health Organization. Report on the global tobacco epidemic, 2008 [2012-08-31].http://whqlibdoc.who.int/publications/2008/9789241596282_eng.pdf.
- [8] World Health Organization. 10 facts on second-hand smoke, 2009 [2012-07-28].<http://www.who.int/features/factfiles/tobacco/en/>.
- [9] World Health Organization. Global Health Observatory, 2012 [2012-07-09].<http://www.who.int/gho/tobacco/en/index.html>.
- [10] Centers for Disease Control and prevention. Smoking & Tobacco use, secondhand smoke facts, 2012 [2012-06-28].http://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/general_facts/.
- [11] Hawaii State Department of Health. Tobacco prevention and education program. [2012-07-31].<http://hawaii.gov/health/healthylifestyles/tobacco/resources/general/trends.pdf>.
- [12] Lin PL, Huang HL, Lu KY, et al. Second-hand smoke exposure and the factors associated with avoidance behavior among the mother of pre-school children: a school-based cross-sectional study. *BMC Public Health*, 2010, 10(606), 10.1186/1471-2458-10-606.
- [13] Kurtz ME, Kurtz JC, Johnson SM, et al. Exposure to environmental tobacco smoke: perceptions of African American children and adolescents. *Preventive Medicine*, 1996, 25:286-292.
- [14] Wang WL, Herting JR, Tung YY. Adolescents' avoidance of secondhand smoke exposure: model testing. *Western Journal of Nursing Research*, 2008, 3(4):8-12.
- [15] Choy LB, Maddock JE. Correlates of smoke-free policies in homes and cars among Hawaii residents. *Californian Journal of Health Promotion*, 2005, 3(4):8-20.
- [16] Heinrich KM, Jokura Y, Maddock JE. Exercise self-efficacy and social norms as psychological predictors of exercise behavior. *International Journal of Sport and Exercise Psychology*, 2008, 10.
- [17] Hawaii Health Data Warehouse. Secondhand smoke, smoking rules in home, smoking rules in the home by school type and indicator for the year(s)-2007, 2009, 2011 [2012-07-20].http://www.hhdw.org/cms/uploads/Data%20Source_%20YTS/YTS_Secondhand%20Smoke_IND_00009.pdf.
- [18] Hawaii Health Data Warehouse. Secondhand smoke, smoking rules in the car, smoking rules in the car by school type and indicator, for the year(s)-2007, 2009, 2011 [2012-07-20].http://www.hhdw.org/cms/uploads/Data%20Source_%20YTS/YTS_Secondhand%20Smoke_IND_00010.pdf.
- [19] Centers for Disease Control and Prevention. Secondhand Smoke Factors, disparities in secondhand smoke exposure. [2012-07-31].http://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/general_facts/index.htm.
- [20] Dillow KA, Chase RA. Secondhand smoke exposure, awareness and prevention among African-Born women. *American Journal of Preventive Medicine*, 2010, 39:S37-S43.
- [21] Li MF, Wang RH. Factors related to avoidance of environmental tobacco smoke among adolescents in southern Taiwan. *Journal of Nursing Research*, 2006, 14:103-112.
- [22] Kurtz ME, Kurtz JC, Johnson SM, et al. Beverly EE. Exposure to environmental tobacco smoke-perception of African American children and adolescents. *Preventive Medicine*, 1996, 25(3):286-292.
- [23] Blumberg SJ, Luke JV. Coverage bias in traditional telephone surveys of low income and young adults. *Public Opinion Quarterly*, 2007, 71(5):734-749.

Effective Recovery of Infectious Human Enterovirus from Environmental Waters for Their Application for Water Quality Monitoring^{*}

Zi Wang¹, Si Sun^{1,2}, Christina Connell¹, Yuanan Lu^{1,2}

1. University of Hawaii at Manoa Department of Public Health Sciences, Honolulu 96822, USA;

2. Wuhan University Global Health Institute, Wuhan 430071, China

Abstract: Human enteric viruses are currently being tested as alternative indicators for enhanced monitoring of recreational water quality. Laboratory methods for the effective concentration and molecular-based detection of enteric viruses from environmental waters have recently been reported. However, in order to establish a practical monitoring system using enteric viruses as indicators, there is a need to develop optimized methods for the effective recovery of infectious viruses from environmental waters. In this study, using Poliovirus 1 as a surrogate model, different laboratory conditions for the effective concentration and elution of infectious viruses from environmental waters were comparatively tested and analyzed. Elution with 3% beef extract in 50 mM glycine was shown to be the most effective buffer for maximal viral recovery (>90%). In addition, it was found that shaking concentrated filters with the elution buffer is a more effective recovery method than direct elution through the filters ($p < 0.001$). Our findings have demonstrated that infectious viruses can be effectively concentrated and eluted for in vitro detection, supporting the notion that human enteric viruses may indeed be utilized as practical indicators for the effective assessment of recreational water quality.

Key words: Human enteric virus; recovery of infectious virus; viral infectivity assay; water monitoring

1 Introduction

Millions of gallons of treated and untreated wastewater are discharged into the world's oceans every day^[1]. Due to negative impacts such as increased occurrence of fecal-oral waterborne diseases, this is a public health concern. Studies have shown that fecal contamination has been the main

cause of waterborne illness, affecting more people globally than other type of infectious waterborne diseases^[2]. A recent article demonstrated that the number of viral outbreaks has actually increased over the past years^[3]. In order to reduce and eliminate health risks and enhance protection of the public from recreational waterborne illnesses, it is of crucial importance to regularly monitor water quality using effective methods^[4].

Received: 2014-02-11; **Revised:** 2014-02-22

^{*} Paper presented at the 45th APACPH Conference hosted by the School of Public Health at Wuhan University, October, 2013.

Author: Zi Wang, Christina Connell, student of Department of Public Health Sciences, University of Hawaii at Manoa; Si Sun, student of Department of Public Health Sciences, University of Hawaii at Manoa and Wuhan University Global Health Institute; Yuanan Lu, professor of Department of Public Health Sciences, University of Hawaii at Manoa and Wuhan University Global Health Institute

Corresponding Author: Yuanan Lu, Department of Public Health Sciences, University of Hawaii at Manoa. E-mail: yuanan@hawaii.edu

Currently, the assessment of recreational water quality is primarily dependent on the growth-based counting and measurement of fecal indicator bacteria (FIB), which include *E. coli*, enterococci, fecal coliform, and total coliform bacteria^[5,6]. Since the establishment and enforcement by EPA in 1986^[7], the FIB system has been widely used for monitoring water quality over the past two decades. Detection methods for these FIB are relatively simple, rapid, inexpensive, and well-standardized for wide application^[8,9]. In addition, epidemiological studies have shown that the detection of FIB could indicate the presence of potential fecal pathogens^[10], and exposure to elevated level of these FIB is linked with increased risk of contracting gastrointestinal diseases^[11]. However, several major limitations are associated with FIB monitoring system. For instance, their source is not solely limited to human feces^[9], and improper correlation between fecal pathogens and waterborne illness incidents exists^[12]. FIB persist and even multiply in the environment after secretion from their host, yielding inaccurate estimations of true fecal pollution levels^[13-19]. In addition, bacterial indicators often fail to reliably reflect the presence of pathogenic viruses^[3,20-22], potentially leading to viral-related outbreaks of waterborne disease from waters that either met the state or local bacterial water quality criteria or were free of indicator bacteria^[3,23-26]. Clearly, bacterial indicators cannot be solely relied upon to accurately assess microbial water quality.

To facilitate more accurate monitoring of recreational water quality and improved protection of the public from waterborne diseases, human enteric viruses are presently being tested as alternative indicators for enhanced water quality monitoring^[18,27-29]. Human enteric viruses are the main cause of most recreational waterborne illnesses^[30-32]. Over 100 types of viral pathogens may be presented in sewage-impacted water^[33]. Viruses are able to survive longer than indicator bacteria in

both fresh and marine water environments and are generally more resistant than FIB during conventional wastewater treatment processes^[18]. Recent publications have shown that under optimized laboratory conditions, low numbers of enteric viruses can be efficiently concentrated from environmental waters, and effective molecular-based protocols have been described for the sensitive detection of several types of human enteric viruses, including human noroviruses, adenovirus, enterovirus, and fecal indicator virus male-specific RNA coliphage (FRNAC)^[29,34-26]. To facilitate the practical establishment of using human enteric viruses for enhanced water quality monitoring, this study focuses on the development of optimized laboratory conditions for the effective recovery of infectious viruses from environmental waters, using poliovirus type 1 as an enteroviral representative.

2 Materials and methods

2.1 Cells

Green Africa monkey kidney Vero cells (ATCC, Manassas, VA, Cat, No. CCL-81TM) were used for propagation and titration of infectious poliovirus in this study. Cells were cultured and maintained with MEM medium (Minimum Essential Medium Eagle, Manassas, VA 20109), 10% heat-inactivated FBS (fetal bovine serum, HyClone, UT) and 1% PS solution (100U/ml penicillin, 100U/ml streptomycin sulfate) in TC-75 cm² cell culture flasks (Greiner Bio-One, Germany) at 37°C with a humidified 5.0% CO₂, and passed every 3-4 days by trypsinizing with trypsin-versine solution (Sigma-Aldrich, MO). All cell culture operations were conducted inside a cell culture biosafety hood (SterilGARD III Advance^o and The Baker Company, Sanford, ME).

2.2 Poliovirus type 1

Viral isolates A laboratory strain of poliovirus type 1 originally obtained from Dr. Philip C. Loh (University of Hawaii at Manoa) was used in this

study as a model virus for laboratory procedure optimization. All the viral propagation and viral quantification assays were performed in a cell culture biosafety hood (Labconco Purifier Class II Biosafety Cabinet Delta Series, Labconco, MO) equipped with a UV sterilization lamp.

Viralstock Vero cells at their exponential growth phase were harvested using trypsin-EDTA solution and individual cell suspensions were seeded into TC75cm² flasks. After a 24-hr incubation and cell growth, cell monolayers formed in the flasks were infected with 1 ml of Poliovirus at MOI of 0.01. Infected cultures were incubated at 37°C and then transferred to -80°C freezer when 90% of the cells showed cytopathic effects (CPE). The flasks were removed from the freezer and completely thawed at room temperature, then stored in -80°C freezer again. After 2 more freeze-thaw cycles, the culture medium was collected from the flasks and cell debris was removed through centrifugation at 3,000 rpm (Beckman) for 5 minutes. Recovered supernatant was transferred into 1.5-mL centrifuge tubes at 0.5 mL/vial, and aliquots of virus were stored in -80°C and used a viral stock for this study.

Plaque assay Quantification of infectious poliovirus was conducted by using a plaque assay with methylcellulose used as overlay medium. In brief,

Vero cells at exponential growth phase were harvested and seeded into 6-well plates at 3×10^5 cells/well. Following the 24-hr incubation at 37°C and the formation of a cell monolayer, the cell medium was discarded and the Vero cell monolayer was rinsed twice with MEM-0 at 2 mL/well. Poliovirus solution to be titrated was 10-fold diluted (up to 10^{-8}) with MEM-0 containing no FBS, and each diluted virus was inoculated into the plate at 0.2 mL/well and three well per dilution. 0.2 mL of MEM-0 was added to one well as a negative control. The plate was incubated at 37°C for 1-2 hrs for viral adsorption. The plate was gently rocked

from side to side every 15 minutes to allow an even distribution of infectious viruses. Residual viral solution was removed from the wells after the adsorption and 2 mL/well of overlay medium consisting of MEM with 2% FBS and 5% Agar was added (Sparks, MD21151, U. S. A. Cat. No. 0140-01). The plate was incubated at 37°C to allow the formation of virus-induced plaques. At day 2-3 when plaques became readily visible, crystal violet staining solution [6.0 g crystal violet dissolved in 400 mL formaldehyde 37% w/w (Sigma-Aldrich, St. Louis, Mo) and 600 ml ddH₂O] was added to each well at 2 mL/well, and the plate was stained at room temperature for 24 hrs and then vigorously washed with tap water. Viral plaques were counted and viral titer was calculated as follows:

Viral titer (plaque units / mL) = # plaques counted x dilution factor x inoculum factor (mL)

2.3 Water sample preparation

To establish optimized laboratory methods for the effective concentration and recovery of infectious viruses from seawater, 1 mL of poliovirus 1 stock (1.0×10^6 FPU/mL) was spiked into 1 liter of qualified seawater (from Waikiki aquarium, Honolulu) to generate a final concentration of 1.0×10^3 FPU/mL. Sea water was then supplemented with MgCl₂ solution to reach a final concentration of 25 mM and passed through negatively charged type-HA filter membranes (47 mm in diameter, Millipore Corporation, MA) with 0.45 um pore size as described previously (Tong et al. 2011). The membranes were then rinsed with 200 ml of 0.5 mM H₂SO₄ (pH 3.0) to remove cations, followed by virus elution with various buffers and procedures.

2.4 Filtration-elution vs shaking elution

Two types of virus elution procedures were comparatively tested in this study. For virus elution through filtration, concentrated virus was eluted from the membranes by adding 5 mL of the elution buffer. After 5 minutes incubation at room temperature ($24 \pm 1^\circ\text{C}$), concentrated virus was e-

luted and collected into a sterile flask. Recovered virus was centrifuged at 3000 rpm for 5 min and titered by plaque assay as described above. For viral elution through the shaking method, membranes were removed from the filtration unit and transferred to 15-mL centrifuge tubes containing 5 ml of selected elution buffer. These 15-mL centrifuge tubes were shaken on a vortex adapter combined with an analog vortex mixer (VWR, CAT No. 588160121, U. S. A) at speed 6 for 30 minutes at 4°C. Recovered virus was then centrifuged at 3000 rpm for 5 min. Supernatant was collected and the viral titration test was applied.

2.5 Elution buffers

To determine an optimized laboratory procedure for the effective recovery of infectious viruses from concentrated membranes, three different elution buffers were comparatively tested in this study, including 1 mM NaOH (pH 10.8), 3% Beef extract in 0.05 M glycine (pH 9.5), and 0.05 M KH_2PO_4 in 1 M NaCl (pH 9.2). For the NaOH elution buffer, 1 mL of 10X TE buffer (pH 8.0) and 50 μL 100 mM H_2SO_4 (pH 1.0) were added into the flasks to neutralize NaOH.

In addition, three selected concentrations for each elution buffer were tested, including NaOH solution at 1 mM, 5 mM, and 10 mM; 1%, 3%, and 5% of beef extract solution; and KH_2PO_4 at 1 mM, 5 mM, and 10 mM.

2.6 Optimal shaking time

Once the membrane-shaking method was found to be more effective than direct filtration in virus recovery, a comparative test was performed to determine an optimal shaking time for virus elution. A total of 6 different time points were tested ranging from 10 min to 120 min. In this test, the filter membrane was transferred into a 15-mL centrifugation tube containing 5 ml of selected elution buffer and shaken on a vortex mixer at speed 6 as described above. At each selected time point, 0.5 mL of the eluent was sampled from the centrifugation tube and tested for viral recovery using the vi-

ral plaque assay.

2.7 Samples pretreatment

Prior to performing the viral plaque assays, all eluted virus samples were pretreated with antibiotic incubation medium (AIM) containing 1x MEM with 1000 U/mL Penicillin, 1000 U/mL streptomycin, 25 $\mu\text{g}/\text{mL}$ Amphotericin B, and 500 $\mu\text{g}/\text{mL}$ Gentamicin at a ratio of 1:2 (v/v) and incubated at 4°C for 2-4 hrs. Each test was conducted in three independent experimental assays. Also, each viral dilution was tested in triplicate wells to ensure reliable experimental data.

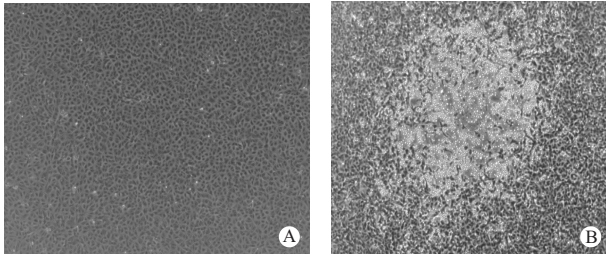
2.8 Data analysis

By using SPSS software, one-way ANOVA was performed to all plaque assay data, with a p value = 0.05.

3 Results

In this study, a laboratory strain of Poliovirus type 1 was used as a prototype enteric virus for the establishment of optimized laboratory conditions for the efficient recovery of infectious viruses from environmental waters. Poliovirus replicates in Vero cells rapidly, and viral induced cytopathic effect often become apparent within 24 hrs post infection (Figure 1). The titer of the Poliovirus stock generated for this study was quantified using a viral plaque assay performed in either 6-or 12-well plates. Figure 2 shows the typical plaque formation of poliovirus-infected Vero cells in a 6-well plate, showing a strong linear correlation between the virus dilution and the number of virus-induced plaques in infected cells.

Comparative analysis of the two elution methods with three buffers showed mixed results. As shown in Figure 3, the filtration method mediated a recovery rate of 26% infectious poliovirus, showing no significant difference in virus recovery ($p=0.921$) among three elution buffers. Poliovirus elution from the concentrated membrane appeared to be more effective when NaOH and KH_2PO_4



A) Prior to poliovirus infection and B) poliovirus infected Vero cells at post infection 24 hours showing viral induced CPE. Original magnification: 100x

Figure 1 photomicrographs of poliovirus infection of seeded in TC 25cm flasks. Vero cells.

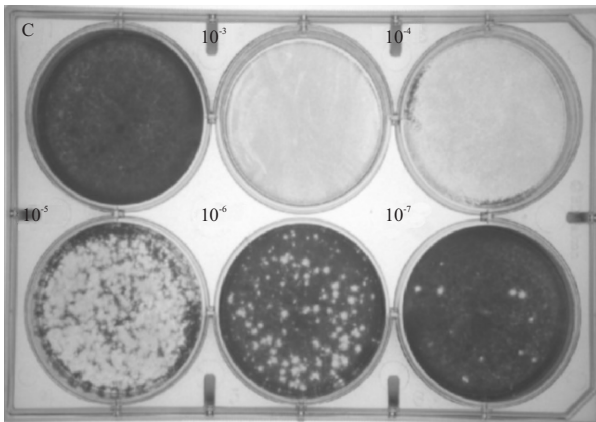


Figure 2 Plaque assay showing Poliovirus induced plaque formation in Vero cells in 6-well plate and a linear reduction of plaque numbers with viral dilution.

buffers were used, while the shaking method is more effective when 3% BE solution was used. Although shaking the membrane in KH_2PO_4 buffer resulted in no recovery of infectious virus, this elution method works extremely well with beef extract, as more than 90% of infectious virus was recovered using the established laboratory procedures.

To establish optimized conditions for effective virus elution using the membrane-shaking method, each buffer was tested at three different concentrations. As shown in Figure 4, 3% BE was the most effective elution buffer for the recovery of infectious poliovirus from concentrated membranes. Decreased (1%) or increased (5%) concentration

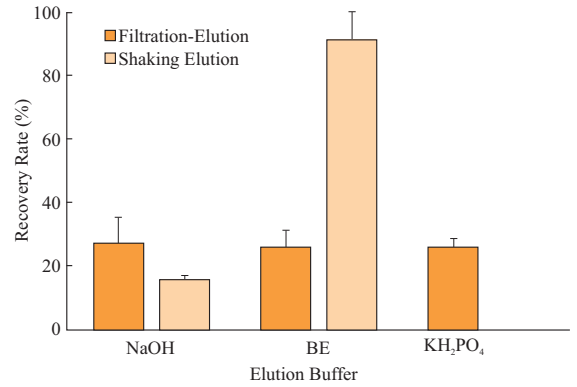


Figure 3 Comparison of two elution methods for their effective elution of infectious polioviruses with selected buffers.

of beef extract resulted in decreased virus recovery from the concentrated membrane. Approximately 20% of infectious Poliovirus was recovered with NaOH when 1 mM concentration was used, while increased NaOH buffer concentration to 5 mM and 10 mM resulted in decreased viral recovery. In this study, shaking elution with three different concentrations of KH_2PO_4 buffers ranging from 1 mM to 10 mM resulted in no recovery of infectious poliovirus (Figure 4).

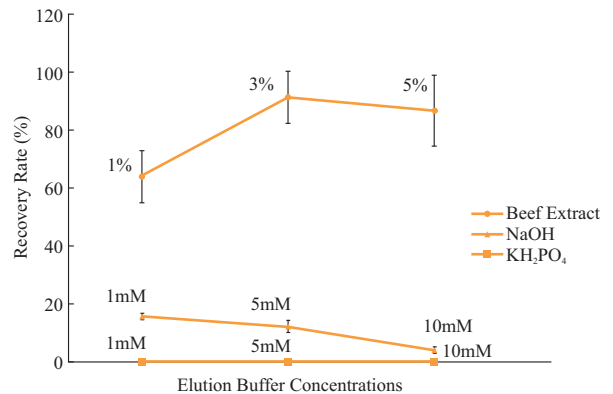


Figure 4 Effect of different concentrations of selected elution buffers on the recovery of infectious polioviruses from concentrated membrane by shaking method.

To determine the optimized shaking time for maximal recovery of infectious virus from concentrated membranes, 6 shaking times ranging from 10-120 min were examined by testing samples taken from the selected time points for viral infec-

tivity. As shown in Figure 5, over 60% infectious virus was recovered when the membrane was shaken with 3% BE; recovery of infectious virus increased with shaking time up until 30 min (>90%). Recovery of infectious virus dropped when shaking time increased to 60 min and decreased to 58% when the concentrated membrane was shaken for 2 hrs.

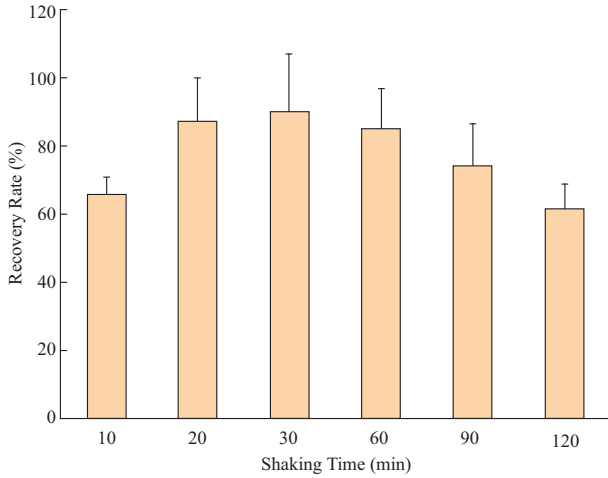


Figure 5 Effect of shaking time on the recovery of infectious polioviruses with 3% Beef Extract.

4 Discussion

Human enteric viruses, the main etiological agents in most swimming-associated illnesses, are currently being considered as alternative indicators for human-origin fecal contamination in aquatic environments^[18,22,27-29,30-33,37]. Compared to the FIB, enteric viruses are more resistant to current wastewater treatment processes^[38], more stable in the aquatic environment, and able to maintain infectivity for a longer time^[1,8,18,33,39]. In addition, their low infectious dose and stringent host specificity with no replication in the aquatic environment are also advantageous when considering enteric viruses for enhanced monitoring of recreational water for safety^[8,18].

Rapid detection of human enteric viruses from

environmental waters is currently conducted using PCR and quantitative RT-PCR^[23,29,34-37,40-46]. Recent reports have indicated that several enteric viruses, including both RNA and DNA viruses, can be very effectively detected from both fresh and marine waters using newly established protocols^[29,34,35]. These reports collectively suggest that it is possible to detect even low numbers of human enteric viruses from environmental waters by employing highly sensitive techniques.

However, due to their inability to differentiate infectious from non-infectious virus particles, molecular-based methods can only be used for preliminary and presumptive water quality monitoring. Although as few as one infectious viral particle may be able to cause human illness^[23], positive viral detection by PCR-based methods alone may not necessarily indicate the presence of infectious virus or a true health risk. Thus, in order to accurately assess health risk associated with water samples positive for viruses, a follow-up viral infectivity test is essential.

Several methods were comparatively tested and analyzed for their effective concentration and maximized recovery of infectious viruses from environmental waters. Comparison of two viral elution methods using poliovirus as a model revealed that direct filtration-elution recovered only 26% of infectious viruses from spiked water, which is significantly lower than the recovery rate obtained by shaking elution (>90%). The 30-minute shaking of concentrated membranes in elution buffer appeared to greatly enhance viral elution from the membrane. Among the three selected elution buffers tested in this study, 3% beef extract in 0.05M glycine was determined to be the most effective, in comparison with NaOH and KH₂PO₄. These findings are consistent with previous reports^[47,48]. This study also demonstrated that shaking time can be very critical for effective virus recovery; extended shaking time (over 1 hr) did not result in any increase but actually reduced the recovery of infec-

tious poliovirus. This observation may be attributed to physical damage to the membrane, subjecting viral particles to precipitation with membrane debris.

Although effective concentration and elution are known to be limiting factors for the feasibility of utilizing enteric viruses for water quality monitoring, there have been some reports of viral concentration from water using various approaches, including the adsorption-elution method, precipitation method, and ultracentrifugation method^[23,43,49-51]. However, few studies have been conducted focusing on concentrating infectious viruses from recreational waters^[52]. Katayama et al. reported a viral recovery as high as 94%^[43]; however, this detection was not for infectious virus using an infectivity assay but for a viral gene using qPCR. Therefore, to the best of our knowledge, the virus concentration and elution methods were established in this study. It represented the most effective recovery of infectious viruses from environmental waters and could be useful to environmental microbiologists as a valuable tool for wide range of applications.

It should be emphasized that since viral infectivity assays for certain viruses can be time-consuming and technically demanding, cell culture-based viral detection should be conducted only as a follow-up method for water samples that tests positive using molecular methods. It is also known that some enteric viruses, such as norovirus, currently lack susceptible cell culture systems; therefore, a need exists to develop in vitro cell culture or other biological systems for the effective detection of these human enteric viruses.

Acknowledgement

This work was supported in part by grants from the Centers for Oceans and Human Health (COHH) program, the National Institutes of Environmental Health Sciences (P50ES012740) and

the National Science Foundation (OCE04-32479 and OCE09-11000), and the Hawaii community Foundation (11ADVC-49702).

References

- [1] Rao VC, Metcalf TG, Melnick JL. Development of a method for concentration of rotavirus and its application to recovery of rotaviruses from estuarine waters. *Applied and Environment Microbiology*, 1986, 52(3):484-8.
- [2] Jofre J, Blanch AR. Feasibility of methods based on nucleic acid amplification techniques to fulfil the requirements for microbiological analysis of water quality. *Journal of Applied Microbiology*, 2010, 109(6):1853-67.
- [3] Sinclair RG, Jones EL, Gerba CP. Viruses in recreational water-borne disease outbreaks: a review. *Journal of Applied Microbiology*, 2009, 107:1769-1780.
- [4] U. S. EPA (Environmental Protection Agency). Manual of Methods for Virology. EPA/600/4-84/013. [2011]. <http://www.epa.gov/nerlcwww/about.html>.
- [5] Turbow DJ, Osgood ND, Jiang SC. Evaluation of recreational health risk in coastal waters based on enterococcus densities and bathing patterns. *Environment Health Perspectives*, 2003, 111(4):598-603.
- [6] Choi S, Jiang SC. Real-time PCR quantification of human adenoviruses in urban rivers indicates genome prevalence but low infectivity. *Applied Environment Microbiology*, 2005, 71:7426-7433.
- [7] U. S. EPA (Environmental Protection Agency). (1986) Ambient water quality criteria for bacteria. EPA440/5-84-002. US EPA, Washington, DC.
- [8] Lees D. Viruses and bivalve shellfish. *International Journal of Food Microbiology*, 2000, 59(1-2):81-116.
- [9] Boehm AB, Fuhrman JA, Mrse RD, et al. Tiered approach for identification of a human fecal pollution source at a recreational beach; Case study at Avalon Bay, Catalina Island, California. *Environment Science and Technology*, 2013, 37:673-680.
- [10] U. S. EPA (Environmental Protection Agency). Health Concerns at Beaches. Electronic resources. [2006]. http://water.epa.gov/type/oceb/beaches/upload/2007_02_13_beaches_report_full-rtc.pdf.
- [11] Byappanahalli MN, Nevers MB, Korajkic A, et al. Enterococci in the environment. *Microbiology and Molecular Biology*, 2012, 76(4):685-706.
- [12] Snyder MA, Ng P, Mekosh H, et al. PEG enhances viral clearance on ceramic hydroxyapatite. *Journal of Separation Science*, 2009, 32(23-24):4048-51.
- [13] Davies CM, Long JA, Donald M, et al. Survival of fecal mi-

- croorganisms in marine and freshwater sediments. *Applied and Environment Microbiology*, 1995, 61:1888e1896.
- [14] Bernhard AE, Field KG. Identification of nonpoint sources of fecal pollution in coastal waters by using host-specific 16S ribosomal DNA genetic markers from fecal anaerobes. *Applied and Environment Microbiology*, 2000, 66(4):1587-94.
- [15] Desmarais TR, Solo-Gabriele HM, Palmer CJ. Influence of soil on fecal indicator organisms in a tidally influenced subtropical environment. *Applied and Environment Microbiology*, 2002, 68:1165e1172.
- [16] Byappanahalli MN, Fukioka R. Indigenous soil bacteria and low moisture may limit but allow faecal bacteria to multiply and become a minor population in tropical soils. *Water Science and Technology*, 2004, 50:27-32.
- [17] Byamukama D, Mach RL, Kansiime F, et al. Discrimination efficacy of fecal pollution detection in different aquatic habitats of a high-altitude tropical country, using presumptive coliforms, *Escherichia coli*, and *Clostridium perfringens* spores. *Applied and Environment Microbiology*, 2005, 71(1):65-71.
- [18] Fong TT, Lipp EK. Enteric viruses of humans and animals in aquatic environments: health risks, detection, and potential water quality assessment tools. *Microbiology and Molecular Biology Reviews*, 2005, 69:357-371.
- [19] Byappanahalli MN, Whitman RL, Shively DA, et al. Seasonal persistence and population characteristics of *Escherichia coli* and enterococci in deep backshore sand of two freshwater beaches. *Journal of Water and Health*, 2006, 4(3):313-20.
- [20] Noble RT, Fuhrman JA. Enteroviruses detected by reverse transcriptase polymerase chain reaction from the coastal waters of Santa Monica Bay, California; low correlation to bacterial indicator levels. *Hydrobiologia*, 2001, 460:175-184.
- [21] Gabrieli R, Macaluso A, Lanni L, et al. Enteric viruses in molluscan shellfish. *New Microbiology*, 2007, 30(4):471-5.
- [22] Terio V, Di Pinto A, Di Pinto P, et al. RNA extraction method for the PCR detection of hepatitis A virus in shellfish. *International Journal of Food Microbiology*, 2010, 142(1-2):198-201.
- [23] Bosch A, Guix S, Sano D, et al. New tools for the study and direct surveillance of viral pathogens in water. *Current Opinion in Biotechnology*, 1998, 19:295-301.
- [24] Papapetropoulou M, Vantarakis AC. Detection of Adenovirus outbreak at a municipal swimming pool by nested PCR amplification. *Journal of Infection*, 1998, 36:101-103.
- [25] Hauri AM, Schimmelpennig M, Walter-Domes M, et al. An outbreak of viral meningitis associated with a public swimming pond. *Epidemiology and Infection*, 2005, 133(2):291-8.
- [26] Okoh AI, Sibanda T, Gusha SS. Inadequately treated wastewater as a source of human enteric viruses in the environment. *International Journal of Environment*, 2010, 7:2620-2637.
- [27] Jiang S, Noble R, Chu W. Human adenoviruses and coliphages in urban runoff-impacted coastal waters of Southern California. *Applied and Environment Microbiology*, 2001, 67:179-184.
- [28] U. S. EPA (Environmental Protection Agency). Report of the experts scientific workshop on critical research needs for the development of new or revised recreational water quality criteria. EPA 823-R-07e006, United States Environmental Protection Agency, Washington D. C. Accessibility verified 2007.
- [29] Tong H, Lu Y. Effective detection of human adenovirus in Hawaiian waters using enhanced PCR methods. *Virology Journal*, 2011, 8:57.
- [30] Jiang SC, Chu W. PCR detection of pathogenic viruses in southern California urban rivers. *Journal of Applied Microbiology*, 2004, 97(1):17-28.
- [31] Walters SP, Field KG. Survival and persistence of human and ruminant-specific faecal Bacteroidales in freshwater microcosms. *Environmental Microbiology*, 2009, 11(6):1410-21.
- [32] Soller JA, Schoen ME, Bartrand T, et al. Estimated human health risks from exposure to recreational waters impacted by human and non-human sources of faecal contamination. *Water Research*, 2010, 44(16):4674-91.
- [33] Lipp EK, Lukasik J, Rose JB. Human enteric viruses and parasites in the marine environment. *Methods in Microbiology*, 2001, 30:559-588.
- [34] Tong H, Connell C, Boehm AB, et al. Effective detection of human noroviruses in Hawaiian waters using enhanced RT-PCR methods. *Water Research*, 2011, 45:5837-5848.
- [35] Connell C, Tong H, Wang Z, et al. New approaches for enhanced detection of Enteroviruses from Hawaiian environmental waters. *PLoS ONE*, 2012, 7(5):e32442.
- [36] Allmann E, Pan L, Li L, et al. Presence of Enteroviruses in recreational water in Wuhan China. *Journal of Virological Methods*, 2013, 193:327-331.
- [37] Griffin DW, Donaldson KA, Paul JH, et al. Pathogenic human viruses in coastal waters. *Clinical Microbiology Reviews*, 2003, 16:129-143.
- [38] Fujioka RS, Loh PC, Lau LS. Survival of human enteroviruses in the Hawaiian ocean environment; Evidence for virus-inactivating microorganisms. *Applied and Environment Microbiology*, 1980, 39:1105-1110.
- [39] Rajtar B, Majek M, Polanski L, et al. Enteroviruses in water environment—a potential threat to public health. *Annals of Agricultural and Environmental Medicine*, 2008, 15:199-203.
- [40] Chung H, Jaykus L, Sobsey MD. Detection of human enteric viruses in oysters by in vivo and in vitro amplification of nucleic acids. *Applied and Environment Microbiology*, 1996, 62:3772-3778.

- [41] Häfliger D, Gilgen M, Lüthy J, et al. Seminested RT-PCR systems for small round structured viruses and detection of enteric viruses in seafood. *International Journal of Food Microbiology*, 1997, 37(1): 27-36.
- [42] Toze S. PCR and the detection of microbial pathogens in water and wastewater. *Water Research*, 1999, 33 (17): 3545-3556.
- [43] Katayama H, Shimasaki A, Ohgaki S. Development of a virus concentration method and its application to detection of Enterovirus and Norwalk virus from coastal seawater. *Applied and Environment Microbiology*, 2002, 1033-1039.
- [44] Haramoto E, Katayama H, Ohgaki S. Detection of Noroviruses in tap water in Japan by means of a new method for concentrating enteric viruses in large volumes of freshwater. *Applied and Environment Microbiology*, 2004, 2154-2160.
- [45] da Silva AK, Le Saux JC, Parnaudeau S, et al. Evaluation of removal of noroviruses during wastewater treatment, using real-time reverse transcription-PCR; different behaviors of genogroups I and II. *Applied and Environment Microbiology*, 2007, 73: 7891-7897.
- [46] Rodriguez MJ, Greenbaum E. Detection limits for real-time source water monitoring using indigenous freshwater microalgae. *Water Environment Research*, 2009, 81(11): 2363-71.
- [47] Monpocho S, Maul A, Cadiergues B, et al. Best viral elution method available for quantification of Enterovirus in sludge by both cell culture and reverse transcription-PCR. *Applied and Environment Microbiology*, 2001, 2484-2488.
- [48] Brassard J, Seyer K, Houde A, et al. Concentration and detection of Hepatitis A Virus and Rotavirus in spring water Samples by reverse transcription-PCR. *Journal of Virological Methods*, 2005, 123: 163-169.
- [49] Katzenelson K, Fattal B, Hostovesky T. Organic flocculation: an efficient second-step concentration method for the detection of viruses in tap water. *Applied and Environment Microbiology*, 1976, 32(4): 638-639.
- [50] Dahling DR, Wright BA. Processing and transport of environmental virus samples. *Applied and Environment Microbiology*, 1984, 47(6): 1272-1276.
- [51] Lewis G, Metcalf TG. Polyethylene Glycol precipitation for recovery of pathogenic viruses, including Hepatitis A Virus and human Rotavirus, from oyster, water, and sediment samples. *Applied and Environment Microbiology*, 1988, 1983-1988.
- [52] Haramoto E, Katayama H, Utagawa E, et al. Recovery of human Norovirus from water by virus concentration methods. *Applied and Environment Microbiology*, 2009, 160: 206-209.

E-mail: qqjk@whu.edu.cn

官方邮件, 欢迎赐稿!

实施性研究—全球健康中的关键方法简介*

顾菁, 郝元涛

中山大学公共卫生学院, 广州 510080

摘要: 在全球健康发展中, 实施性研究作为将健康干预付诸实践的一大类方法, 越来越受到广泛的重视, 但国内相关研究和报道尚不多见。本文通过文献回顾, 对实施性研究提出的背景、概念、理论框架和研究方法进行简要介绍, 并通实例进行说明。在此基础上, 总结实施性研究发展中存在的困难, 并提出我国在开展实施性研究中应加强的方面: 人才培养、课程发展、经费支持和多学科、多部门合作。

关键词: 实施性研究; 全球健康; 概念; 框架; 方法

1 实施性研究的提出

在人类向全球健康迈进的过程中, 疾病预防和治疗的新干预、新措施不断涌现, 同时也带来新的问题, 经研究证明有效的健康干预在人群中未能得到充分应用, 已获得的知识和经验与健康实践之间存在缺口。人类健康也因此付出了重大代价, 其中尤以发展中国家为甚。例如, 全球每年发生约 30 万例孕产妇死亡和约 3 百万例新生儿死亡, 其中 99% 发生在中、低收入国家^[1]; 在撒哈拉非洲和南亚国家, 每年有超过 5 百万人因艾滋病、疟疾和腹泻死亡^[2]。这些疾病和死亡大部分可以通过已知有效的措施预防或治疗(如分娩期间的医疗护理、喷洒驱虫药的蚊帐、艾滋病母婴传播阻断等), 但这些措施却没有在实践中被充分使用。

上述问题提示, 理论上能够实现的健康目标和实际达到的效果之间存在差距, 现有知识还不足以在全球范围内改变健康实践、促进健康公平。分析其原因在于: 由发达地区提出的经验不一定普遍有效; 经严格试验证明有效的干预措施在实践中可能因缺乏政策和资源支持而缺乏可行性和可持续性;

现有干预研究多局限于效力(efficacy)研究, 而缺乏对干预效果(effectiveness)的探讨; 研究忽略了在实施过程中, 周围环境因素对干预效果的影响等^[3]。为解决上述问题, 近年来大量学者就如何实施和推广有效的健康干预进行了探讨, 也由此提出实施性研究(implementation research)的概念。

2 实施性研究的含义

作为新提出的一类方法, 实施性研究在国际上有不同的表述。例如, David Sanders 等认为实施性研究是“促进循证的(evidence-based)干预和政策被采用和成功实施的研究”^[4]; 美国国立卫生院(NIH)的报告中, 实施性研究是“在特定的健康领域, 通过采用和综合循证的健康干预方法, 以改变健康实践模式”^[5]; 国际期刊《Implementation Science》则认为实施性研究是“促进在日常实践中, 系统地采用临床研究和其他循证的实践发现, 以改善医疗服务质量和效果的研究”^[6]。

根据上述定义, 实施性研究针对的是某个已知有效的健康干预, 主要关注如何将该干预在更大范围内推广, 从而使干预被更大程度和更有效地利用,

收稿日期: 2014-02-23; 修回日期: 2014-02-26

* 本文获得中华医学基金会 CMB 项目(13-133)资助

作者简介: 顾菁, 中山大学公共卫生学院副教授; 郝元涛, 中山大学公共卫生学院院长, 教授

通讯作者: 郝元涛, 中山大学公共卫生学院。E-mail: haoyt@mail.sysu.edu.cn

促进全球健康。实施性研究将有助于研究者:除干预技能外,洞悉干预周围的局部环境以及文化、经济、政策等社会因素对执行和推广干预的影响;在较大范围内监控和评价(monitoring and evaluation, M&E)健康干预效果;获得干预为什么有效或无效的经验、了解利益相关者对效果的影响,为干预的扩大和推广提供支持信息;通过回答和解决卫生系统中的问题,促进改善卫生服务质量、强化卫生服务系统;获得健康干预实施中的经验、体会和洞察力等“隐性知识”^[7]。

3 其他相关概念

在健康相关的不同领域(如生物医药、卫生政策

等),与实施性研究相近的表述还包括操作性研究(operational research)、卫生系统研究(health system research)、转化研究(translational research)等。2010年,来自世界卫生组织、世界银行、联合国开发计划署等机构的学者对实施性研究和相关概念从研究重点、产出的使用者和产出的效用三个方面进行定义和区分(表 1)^[8]。概括来说,操作性研究针对某个局部问题,考虑特定的背景,因此在更大范围中不一定适用;实施性研究旨在使现有干预能从某个特定环境扩大到更广泛的卫生系统,范围介于操作性研究和卫生系统研究之间;在卫生系统研究中,所回答的问题从某个具体问题上升到系统和政策层面,具有更为广泛的适用性。但这三者在实践中并不相互排斥,往往存在交叉。

表 1 操作性研究、实施性研究和卫生系统研究区别⁸

	研究重点	研究产出的使用者	研究产出的效用范围
操作性研究 Operational research	卫生系统中(如诊所)某个特定的健康干预在操作中存在的问题	该健康服务的提供者(如医生或护士)	局限于某系统内部
实施性研究 Implementation research	在将某健康干预扩大和推广中的问题	健康服务项目的管理者	系统内部及外部
卫生系统研究 Health system research	影响整个卫生系统运作或其中关键构架的问题	卫生系统管理者、政策制定者	广泛意义的卫生系统

转化医学研究也是目前讨论较多的概念。转化医学有三个转化屏障(T1、T2、T3)和五个阶段(0~4)^[9], T1 转化屏障分隔基础医学研究(阶段 0)和早期人体、临床试验(阶段 1、2), T2 转化屏障分隔阶段 1、2 以及后期临床试验(阶段 3), T3 转化屏障则分隔阶段 3 和实施性研究(阶段 4), 在阶段 4 主要关注如何将临床经验扩大推广到日常医疗实践。和转化医学研究侧重关注临床干预和患病人群相比,实施性研究所关注的健康干预领域和人群都更为广泛。

4 实施和推广框架

实施性研究设计中,理论框架有助于完整地思考、设计、实施和推广健康干预的整个过程。Harris 等提出实施和推广健康干预的框架模型如图 1 所示^[10]。健康干预研究者基于现实健康问题设计创新干预,经效力研究和效果研究检验,在实践中采用、实施和扩大、推广。在实施和推广过程中,涉及

不同类型的个体、机构和系统,同时还需充分考虑社会环境因素的影响。

除此之外,其他常用的理论还包括 RE-AIM 理论、统一框架模型等。

RE-AIM 理论为五个步骤名称的缩写,包括:① Reach(触及目标人群,包括人数、覆盖率、人群的代表性等)、② Effectiveness(干预证实有效,包括干预的主要结局、生存质量等)、③ Adoption(干预被采用,包括采用该干预机构的数量、代表性等)、④ Implementation(干预被预期地实施,以及实施过程中花费的时间和费用等)、⑤ Maintenance(干预的长期效应和可持续性等)^[11]。

统一框架模型(CFIR, The Consolidated Framework for Implementation Research)为综合众多现有理论产生,包括五个领域的要素:① 干预本身特征(应具有固定的核心部分和可调适的外围部分)、② 外部环境(机构外部的政治、经济、社会环境)、③ 内部环境(机构内部在实施干预时相关的组织构架、政

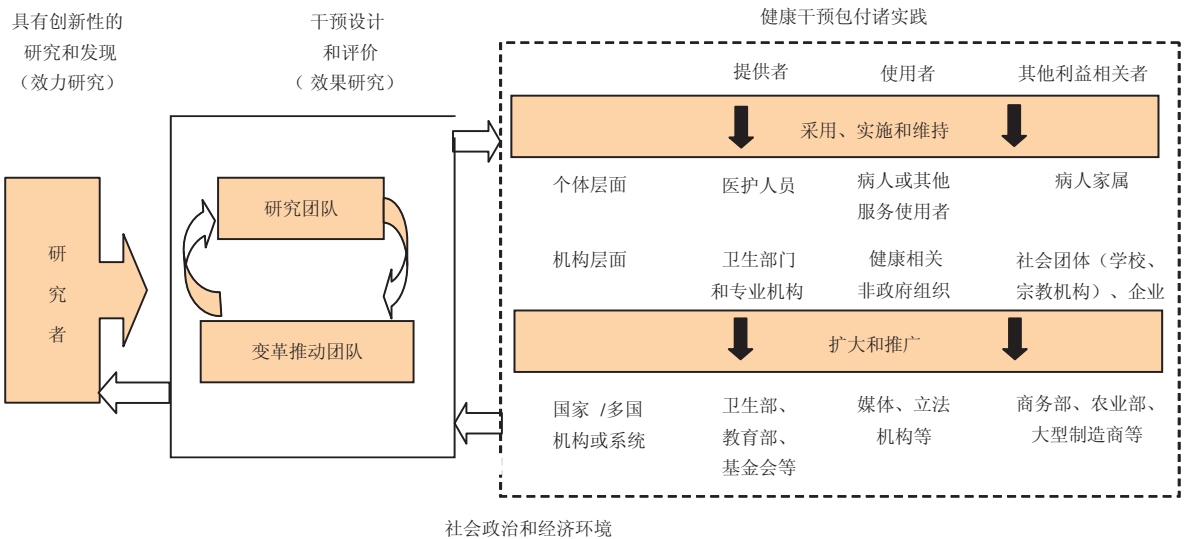


图 1 实施和推广健康干预的框架模型

治、文化等环境)、④干预中个体的特征(个体对干预的认知、对干预自主选择)、⑤实施过程(按照设计目标,实施过程中呈现积极的变化)^[12]。

5 常用研究方法

实施性研究中需要来自流行病学、统计学、人类学、社会学、经济学、政治科学、政策分析、伦理学、信息学等不同学科人员的共同参与,并往往需要定性、定量研究方法相结合。因此,就研究方法而言,没有特定的“实施性研究方法”,它是不同方法的充分融合。以下仅对实施性研究中常用的部分设计方法进行简要介绍。在实践中,除了常用的效果研究之外,卫生经济评价、质量促进研究、统计模型研究、市场营销研究等等也是常用的实施性研究方法。

实效性试验 (Pragmatic trials): 随机对照试验 (Randomized Controlled Trial, RCT) 是检验干预是否有效的“金标准”,但 RCT 往往在严格控制的“试验”条件下进行,对研究对象的纳入和排除标准、对干预的实施条件等有严格规定,因此研究结果的外部效度较差,经验证有效的干预在实践中未必有效或可行。在实施性研究中,更多采用实效性研究,研究对象、实施条件和评价指标等更接近于实际环境,因此研究结果的外部效度较高,能为干预推广提供有力依据。实效性试验中,由于对个体进行随机分组往往不可行,常采用整群随机对照试验 (Cluster Randomized Trial, CRT)^[13]。

效果—实施混合试验 (effectiveness-implementation hybrid trials): 相对于实效性试验关注在“真实世界”中干预的效果,效果—实施混合研究同时还关注干预的实施策略是否有效,因此,在收集研究对象健康相关指标进行干预效果评价的同时,收集实施保真性、可行性、可接受性等指标,进行实施策略评价。相对于先检验效力、再检验效果、进而进行实施策略评价的过程,效果-实施混合研究能够对两方面同时评价,在节省时间的同时,还能对干预和实施策略之间的交互作用进行探讨^[14]。

混合方法研究 (mixed-methods research): 指研究中同时使用定性和定量的研究方法。定量研究多用于量化研究结局、关注因素和两者关系,回答研究假设;定性研究则常用于了解环境、过程、解释现象、形成概念模型或研究假设。常用的设计类型包括:①平行设计:同时收集定性和定量数据;②解释性序贯设计:先收集定量数据,继而收集定性数据以帮助解释定量结果;③探索性序贯设计:先收集定性数据发现问题,进而收集定量数据分析问题的普遍性;④嵌入设计:一类数据嵌入另一类数据的收集过程;⑤多阶段设计:一系列或多个研究,每部分由前述的设计组成。

6 研究实例

南非自 2004 年开始向艾滋病病人提供免费的艾滋病抗病毒 (ARV) 治疗,截至 2007 年,需治疗的病

人中仅三分之一接受治疗,主要问题在于 ARV 治疗需要医生处方,而南非的医生多集中在大医院,初级卫生保健门诊往往没有医生。应南非卫生行政部门要求,Lara 等设计干预并开展实施性研究,在自由州探讨由护士为主导的 ARV 治疗效果和实施策略。项目的干预设计基于前期研究和文献,并历经 18 个月的反复讨论,参加者包括各类利益相关者(卫生部门的资深管理者、中层管理者、资深临床医生、诊所医生、护士、病人等),在形成的干预包中,针对护士培训、病历管理指南、实施指南、项目协调员职责等进行详细规定,同时,根据实际情况,各干预门诊不需要同步开始干预,门诊可根据各自的推进速度,在规定时间内开始执行^[15]。

干预评价中采用实效性试验设计,将州内 31 个初级保健门诊随机分为两组,干预组开展由护士为主导的 ARV 治疗服务,对照组由医生提供的常规治疗服务。研究对象分为两个亚组:达到治疗要求但尚未接受 ARV 治疗者(亚组 1)和目前 ARV 在治者(亚组 2)。结果发现,对于亚组 1,随访 16.3 个月后,干预组的病死率为 20%(1997/4943)而对照组为 19%(747/3862),差异无统计学意义($HR = 0.94$, 95% $CI = 0.76 \sim 1.15$);但对对照组的结核检出率、CD4 细胞计数、随访依从率等结果优于对照组。在亚组 2,随访 12 个月后,干预组的病毒抑制率为 71%(2156/3029)而对照组为 70%(2230/3202),两组差别无统计学意义(率差=1.1%, 95% $CI = -2.4\% \sim 4.6\%$);但干预组的 CD4 细胞计数等指标优于对照组^[16]。

除定量评价外,研究者在实施干预的过程中进行不同目的的定性评价:①针对干预过程的参与式观察,对 31 个参与门诊共观察 170 余次,每次约 2 小时;②项目过程评估,通过 10 个核心小组讨论、26 个深入访谈和 7 次培训和项目督导观察,全面评价执行过程;③组织机构评估,通过对 4 个门诊的观察、对 34 个护士、6 个其他工作人员和 21 个病人的深入访谈,了解初级卫生保健门诊在服务转变过程中组织架构的变化情况。通过定性研究对卫生系统层面、护士和病人层面影响干预实施的对进行详尽的分析和探讨,为干预的推广提供依据^[17]。

7 困难和展望

尽管越来越多的研究者、政策倡导者和决策者开

始关注这一领域,但实施性研究刚刚起步,其发展仍然面临着诸多困难,具体表现在:①人们对什么是实施性研究及其在推广健康干预中的重要作用缺乏了解,对于大多数公共卫生研究者,关注的重点仍然是传统的观察性和分析性流行病学研究;②对于经济欠发达地区,卫生系统不健全、缺乏开展健康干预的人力、物力和技术支持,这样的环境不利于干预的实施和维持;③缺乏针对实施性研究的经费投入,数据显示,发展中国家的卫生经费中仅有 0.017% 被用于实施性研究^[18],在目前投入较多经费的全球健康项目中,用于推广干预实施的经费也非常有限;④开展实施性研究需要跨学科的团队合作和多学科的研究、分析方法,给缺乏跨学科合作模式的地区带来困难。

我国正在大力发展全球健康,要使局部有效的经验在更大范围内推广,发挥中国在全球健康中的作用,我们必须跟上世界的脚步,把实施性研究的思想和方法融入健康干预的设计、开展和评价。我国的实施性研究尚在起步阶段,目前亟待发展的方面包括:①培养一批具有开展实施性研究能力的研究者,他们将作为开拓者,在中国和其他国家开展全球健康相关的实施性研究,并对理论框架、研究方法等开展探索,以适合中国的政治、经济和文化特点;②发展实施性研究课程,面向学生、学者、健康工作者和政策制定者开展相应培训,让实施性研究充分运用到健康干预研究中,并形成支持实施性研究开展的良好环境;③加大经费支持,一方面通过种子基金启动实施性研究的开展,另一方面大力争取国际经费的支持,此外,我国应针对实施性研究提供倾向性的经费支持;④政府、高校、卫生部门、非政府机构、企业等均是实施性研究框架中不可或缺的部分,探讨多学科、多部门、多国家的合作模式,创造实施性研究的开展的良好平台和环境。

致谢 文章撰写中得到华盛顿大学全球健康系教授 Judith N. Wasserheit 和全球健康专业博士生徐东的建议和帮助,在此表示衷心感谢。

参考文献

- [1] The Norwegian Agency for Development Cooperation. The Global Campaign for the Health Millennium Development Goals—Report 2013. Accelerating progress in saving the lives of Women and Children. Norway: Oslo, Norway: Ministry of Foreign Affairs, 2013.

- [2] Lopez AD, Mathers CD, Ezzati M, et al. Global Burden of Disease and Risk Factors. Washington (DC), 2006.
- [3] Wright L. Global Network for Women's and Children's Health Research. Paper presented at: NIH Implementation & Dissemination Conference, 2009 January 28-29.
- [4] Sanders D, Haines A. Implementation research is needed to achieve international health goals. *PLoS medicine*, 2006, 3(6): 719-722.
- [5] Glasgow RE, Vinson C, Chambers D, et al. National Institutes of Health approaches to dissemination and implementation science: current and future directions. *American journal of public health*, 2012, 102(7): 1274-1281.
- [6] Implementation Science. Aims and scope. <http://www.implementationscience.com/about> [2014-01-03] # aimsscope. Accessed on January 30, 2014.
- [7] Peters DH, Tran NT, Adam T. Implementation Research in Health: A Practical Guide. Alliance for Health Policy and System Research, World Health Organization, 2013.
- [8] Remme JH, Adam T, Becerra-Posada F, et al. Defining research to improve health systems. *PLoS Medicine*, 2010, 7(11):1-6.
- [9] Thornicroft G, Lempp H, Tansella M. The place of implementation science in the translational medicine continuum. *Psychological Medicine*, 2011, 41(10):2015-2021.
- [10] Harris JR, Cheadle A, Hannon PA, et al. A framework for disseminating evidence-based health promotion practices. *Preventing Chronic Disease*, 2012, 9:E22.
- [11] Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American Journal of Public Health*, 1999, 89(9): 1322- 1327.
- [12] Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science*, 2009, 50.
- [13] Zwarenstein M, Treweek S, Gagnier JJ, et al. Improving the reporting of pragmatic trials: an extension of the CONSORT statement. *BMJ*, 2008, 337:a2390.
- [14] Curran GM, Bauer M, Mittman B, et al. Effectiveness-implementation hybrid designs: combining elements of clinical effectiveness and implementation research to enhance public health impact. *Medical Care*, 2012, 50(3):217-226.
- [15] Fairall LR, Bachmann MO, Zwarenstein MF, et al. Streamlining tasks and roles to expand treatment and care for HIV: randomised controlled trial protocol, *Trials*, 2008, 9:21.
- [16] Fairall L, Bachmann MO, Lombard C, et al. Task shifting of antiretroviral treatment from doctors to primary-care nurses in South Africa (STRETCH): a pragmatic, parallel, cluster-randomised trial. *Lancet*, 2012, 380(9845):889-898.
- [17] Uebel K, Guise A, Georgeu D, et al. Integrating HIV care into nurse-led primary health care services in South Africa: a synthesis of three linked qualitative studies. *BMC Health Services Research*, 2013, 13:171.
- [18] Madon T, Hofman KJ, Kupfer L, et al. Public health. Implementation science. *Science*, 2007, 318(5857): 1728-1729.

Implementation Research: a Brief Introduction of a Key Research Framework in Global Health

Jing Gu, Yuantao Hao

Sun Yat-sen University School of Public Health, Guangzhou 510080, China

Abstract: In the development of global health, implementation research, which consists of a broad category of methods focusing on turning effective health interventions into health practices, is receiving more and more attention. Implementation research in China, however, is still in its early stage of development. In this paper, we introduced the background, concept, theoretical framework and an example of implementation research. Furthermore, we summarized the difficulties in the development of implementation research worldwide, and the aspects need to be strengthened in order to start implementation research in China.

Key words: Implementation research; global health; concept; framework; methods

耐多药结核病国内外研究状况的文献计量学研究

应朝宇, 谭晓东, 刘 贝, 乐志明

武汉大学公共卫生学院, 武汉 430071

摘要: 本研究目的为客观评价耐多药结核病研究的发展状况和研究趋势, 为今后耐多药结核病研究工作提供参考。检索维普、万方、中国知网、中国生物医学文献数据库(CBM)、PubMed 数据库中的相关文献, 利用 NoteExpress 软件和 Excel 软件按相应纳入排除标准进行筛选后, 进行文献计量学分析。关于耐多药结核病共 1548 篇中文文献和 3175 篇外文文献纳入分析, 文献最早发表于 1993 年; 耐多药结核外文文献发表量中国世界排名第 4, 其中北京和上海贡献量最大; 文献内容按照临床、公卫、基础研究进行分类, 中文文献相比外文文献在研究内容上更侧重于临床治疗方面的研究, 构成比分别为 69.5%、41.2%。耐多药结核病研究发展时间较短, 目前研究内容更侧重于临床治疗研究, 在以后的科研工作中应该更加注重耐多药结核病的预防和治疗并重, 建立发展完善耐多药结核病防治系统长效机制。

关键词: 耐多药结核病; 耐药性; 结核病; 文献计量学

耐多药结核病(MDR-TB)是指结核分枝杆菌至少对异烟肼和利福平这两种最重要的一线抗结核药物耐药的结核病^[1]。2011 年全世界约有 50 万耐多药结核病新发病例, 这些病例中, 约有 60% 就发生在巴西、中国、印度、俄罗斯联邦和南非(“金砖五国”国家), 其中耐多药结核病最高的绝对病例数出现在中国和印度, 占全世界负担的近 50%。此外, 由于标准的 6 个月的一线抗结核药物治疗方案对于耐多药结核病的疗效较差, 患者治疗可能需要长达两年或更长的时间, 而且需要使用药效更小、毒性更大、价格高 50-200 倍以上的药物, 且久治不愈的病人易成为慢性传染源, 进而导致耐药结核菌的广泛播散和流行^[2-4]。

结核分枝杆菌的耐药性是一个重要的公共卫生问题, 威胁到 DOTS 的成功实施, 也威胁到全球结核病控制, 耐多药结核病的出现, 已成为许多国家重大的公共卫生问题和全球结核病有效控制的障碍之一^[5]。文献计量学是循证分析评价中的一种方法, 它是集数学、统计学、文献学为一体, 注重量化的综合性知识体系, 本文旨在通过分析 2012 年及以前国内外发表的耐多药结核病的相关科研文献, 目的是

通过文献计量学分析方法从科研文献产出的角度, 探讨国内外耐多药结核病研究的发展状况和研究趋势, 为今后耐多药结核病相关研究课题和耐多药结核病控制工作的开展提供参考, 现将结果报告如下。

1 资料与方法

1.1 文献来源

本研究以中国知网、维普资讯、万方全文数据库、中国生物医学文献数据库(CBM)、美国生物医学信息检索系统(PubMed)数据库作为文献数据来源, 在中国知网和万方数据库以主题=“耐多药结核病”为检索条件, 在维普数据库使用关键词=“结核病 AND 耐多药 OR 耐多药结核病”为检索条件(维普数据库没有主题检索选项), 在 CBM 数据库中检索式=“结核, 抗多种药物性”[加权: 扩展]进行主题检索, 在 pubmed 数据库检索式=“Tuberculosis, Multidrug-Resistant”[Majr]进行关键主题词检索, 检索时间限定为 2012 年 12 月 31 日之前。

文献纳入标准: 纳入主题为耐多药结核病有关

收稿日期: 2014-02-06; 修回日期: 2014-02-25

作者简介: 应朝宇、刘贝、乐志明, 武汉大学公共卫生学院研究生; 谭晓东, 武汉大学公共卫生学院教授

通讯作者: 谭晓东, 武汉大学公共卫生学院。E-mail: 723906547@qq.com

的基础研究、临床研究、公共卫生研究等。文献排除标准:1. 剔除以报纸、新闻报道等方式发表的文章。2. 剔除信息不全的文章。3. 剔除重复发表的文章。

1.2 方法

在以上数据库分别检索所有文献,导入到 NoteExpress2.0 文献管理分析软件,提取期刊、出版日期、摘要等题录内容,然后进行查重,以及按照文献纳入排除标准,阅读摘要或全文后筛选出关于耐多药结核病的文献,保留并建立 Excel 2003 数据库进行处理分析,描述所检索文献的概况。

2 结果

本次中国知网、万方、维普、CBM、pubmed 五大数据库分别检索出的文献数为 1730、1050、460、1525、3405 篇,按照文献纳入排除标准筛选后最终获得中文文献 1548 篇、外文文献 3175 篇。

2.1 发文量年代趋势分析

国外关于耐多药结核病的研究始于 1993 年,而在国内直到 1997 年才开始这方面的研究,关于耐多药结核病的研究发展时间较短,近年来国内外专家学者对于耐多药结核的研究兴趣在不断增长,文献发表量自 2002 年之后进入高速增长期,但近几年中国关于耐多药结核的研究发问速度不及国际上文献研究的发展,结果如图 1 所示。

2.2 文献主要来源地区分布

中文文献来自全国 31 个省(市)地区,各地发文量差异性很大,其中以北京发表量最高为 160 篇(10.3%),其次是广东、河南,发文量较少的地区如青海省发表量仅为 2 篇。根据中国各省市文献发表量进行排序,发表量排名前 20 的省(市)地区,发表量都在 28 篇以上,结果如图 2 所示;耐多药结核病外文文献发表量按照国家排名,美国排名第 1,478 篇(15.06%),中国排名第 4;而外文文献如果按照

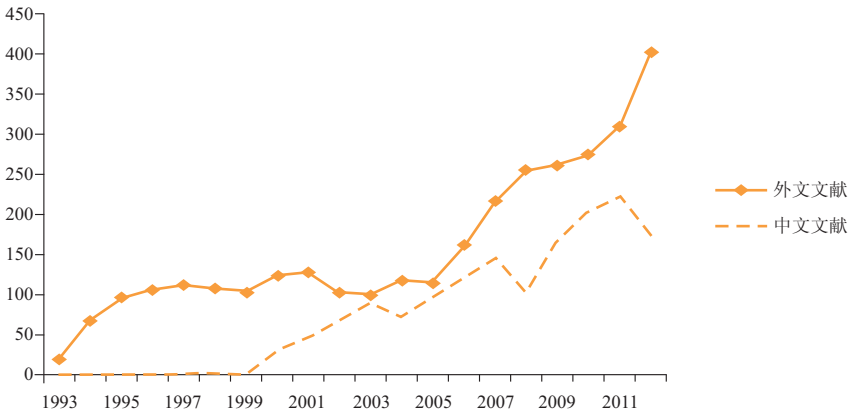


图 1 1993-2012 年关于耐多药结核病研究文献的年代趋势

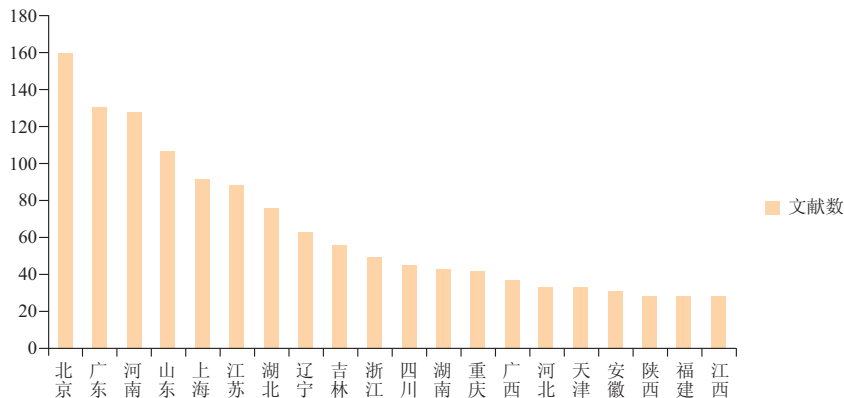


图 2 关于耐多药结核病中文文献发表量排名前 20 的地区分布

发表机构来源国际城市排名,伦敦排名第 1 位,上海和北京分别排名第 9、13 位;对外文文献中中国各省份的贡献量排名,北京和上海遥遥领先于其他省市,结果如表 1 所示。

表 1 耐多药结核病外文文献发表量排名前 10 的国家和地区分布

主要国家	文献数	国际(外文文献)		中国省市	文献数
		主要城市	文献数		
美国	478	伦敦	98	上海	37
印度	161	波士顿	83	北京	34
英国	138	亚特兰大	68	重庆	7
中国	124	纽约	54	山东	6
南非	122	日内瓦	50	广东	6
日本	99	巴黎	47	黑龙江	5
意大利	69	新德里	45	成都	4
瑞士	69	东京	38	武汉	3
法国	61	上海	37	南京	2
韩国	57	斯坦陵布什	34	天津	2

2.3 文献发表主要期刊分析

关于耐多药结核病的中文文献主要分布在 50 个期刊上(载文量 ≥ 6 篇),共 824 篇(53.23%),其中在《临床肺科杂志》、《中国防痨杂志》上的载文量最高,外文文献主要发表在《Int J Tuberc Lung Dis》(国际肺结核与肺病杂志)上,发文量 659 篇(20.8%),远远高于其他期刊,该期刊 SCI 影响因子 2.557,其次是《柳叶刀》杂志,排名前 10 期刊如下表 2;采用中国知网(CNKI)提供的期刊复合影响因子作为中文期刊影响因子的反映指标,查询发表量排名前 50 期刊的影响因子,影响因子最高的杂志是《中华结核和呼吸杂志》,影响因子为 1.003;按照统计需要,将排名前 50 期刊的复合影响因子按照 $IF \geq 1.000$ 、 $0.500 < IF < 1.000$ 、 $IF < 0.500$ 分为三类,文献主要发表在影响因子较低的期刊,结果如表 3。将各地区文献按照核心期刊、中华医学会期刊进行分类,作为评价文献发表质量的一个标准,核心期刊指被《中文核心期刊要目总览》或者《中国科技期刊引证报告》收录的期刊、中华医学会期刊是由中华医学会编辑出版的医学期刊,各地文献排名发生了较大的变化,尤其是吉林省的核心期刊和中华医学会期刊比例明显偏少,文献发表质量较差,而上海地区的核心期刊和中华医学会期刊所占比例很大,文献发表质量较高,结果如表 4 所示。

表 2 耐多药结核病文献发表量排名前 10 的期刊分布

中文文献		外文文献	
中文期刊	文献数	外文期刊	文献数
《临床肺科杂志》	146	《Int J Tuberc Lung Dis》	659
《中国防痨杂志》	135	《Lancet》	98
《中华结核和呼吸杂志》	49	《J Clin Microbiol》	75
《结核病与胸部肿瘤》	29	《Probl Tuberc Bolezn Legk》	70
《结核病与肺部疾病杂志》	29	《Plos One》	67
《中国医药指南》	21	《Clin Infect Dis》	67
《结核病健康教育》	19	《Kekkaku》	66
《中国热带医学》	17	《Eur Respir J》	63
《现代预防医学》	15	《Emerg Infect Dis》	58
《医药论坛杂志》	15	《BMJ》	53

表 3 耐多药结核中文文献发表量排名前 50 期刊的影响因子分布

影响因子	期刊数(%)	文献数(%)
$IF \geq 1$	1(2.0)	49(6.0)
$0.5 < IF < 1$	7(14.0)	189(22.9)
$IF < 0.5$	42(84.0)	586(71.1)
合计	50(100.0)	824(100.0)

表 4 中文文献数排名前 20 地区文献核心期刊和中华医学会期刊分布

地区	全部文献		核心期刊		中华医学会期刊	
	文献数	排名	文献数	排名	文献数	排名
北京	160	1	106(66.3%)	1	29(18.1%)	2
广东	130	2	80(61.5%)	2	14(10.8%)	4
河南	128	3	78(60.9%)	3	15(11.7%)	3
山东	107	4	53(49.5%)	5	10(9.3%)	5
上海	91	5	71(78.0%)	4	45(49.5%)	1
江苏	88	6	45(51.1%)	6	9(10.2%)	6
湖北	75	7	40(53.3%)	7	6(8.0%)	7
辽宁	63	8	22(34.9%)	12	4(6.3%)	8
吉林	56	9	11(19.6%)	18	0(0)	19
浙江	49	10	24(49.0%)	11	1(2.0%)	16
四川	45	11	22(48.9%)	12	2(4.4%)	14
湖南	43	12	27(62.8%)	9	3(7.0%)	10
重庆	42	13	33(78.6%)	8	3(7.1%)	10
广西	37	14	10(27.0%)	19	1(2.7%)	16
河北	33	15	25(75.8%)	10	1(3.0%)	16
天津	33	15	19(57.6%)	16	3(9.1%)	10
安徽	31	17	17(54.8%)	17	2(6.5%)	14
陕西	28	18	19(67.9%)	15	3(10.7%)	10
福建	28	18	21(75.0%)	14	0(0)	19
江西	28	18	10(35.7%)	20	4(14.3%)	8
总计	1295		733(56.6%)		155(12.0%)	

2.4 核心作者分析

我们检索中文文献的第一作者,关于耐多药结核病的科研文献发表量最高作者的论文数为 24 篇,依据普赖斯定律,即 $m=0.749(N_{max}+1/2)$ (n 为论文篇数, n_{max} 为所统计的年限中最高产的那位作者的论文数),发表论文数超过 m 篇的作者即可被称为核心作者,故 $m=8.99$,所以中文文献发文量在 9 篇及以上的作者即为核心作者,根据统计分析发现,发文量在 9 篇以上的核心作者有 7 位,他们主要来自北京和上海,这表明北京和上海已形成了关于耐多药结核研究的核心作者群,结果如表 5 所示。外文文献发表量最高的作者是 Raviglione M,关于耐多药结核病的发文量为 31 篇,Gopubmed 是一种 Pubmed 检索工具,根据 GoPubmed 可做出外

文文献主要研究人员研究关系网络图,Raviglione M、Mukherjee J、Mitnick C 等都为关键作者,结果如下图 3 所示。

表 5 耐多药结核病中文文献核心作者及地区分布

核心作者	文献数	作者机构
唐神结	24	上海市肺科医院
李 亮	15	中国 CDC 结核病防治临床中心
朱莉贞	11	北京市结核病胸部肿瘤研究所
初乃惠	10	北京市结核病胸部肿瘤研究所
肖和平	10	上海市肺科医院
端木宏谨	9	北京市结核病胸部肿瘤研究所
孙强	9	山东大学卫生管理与政策研究中心

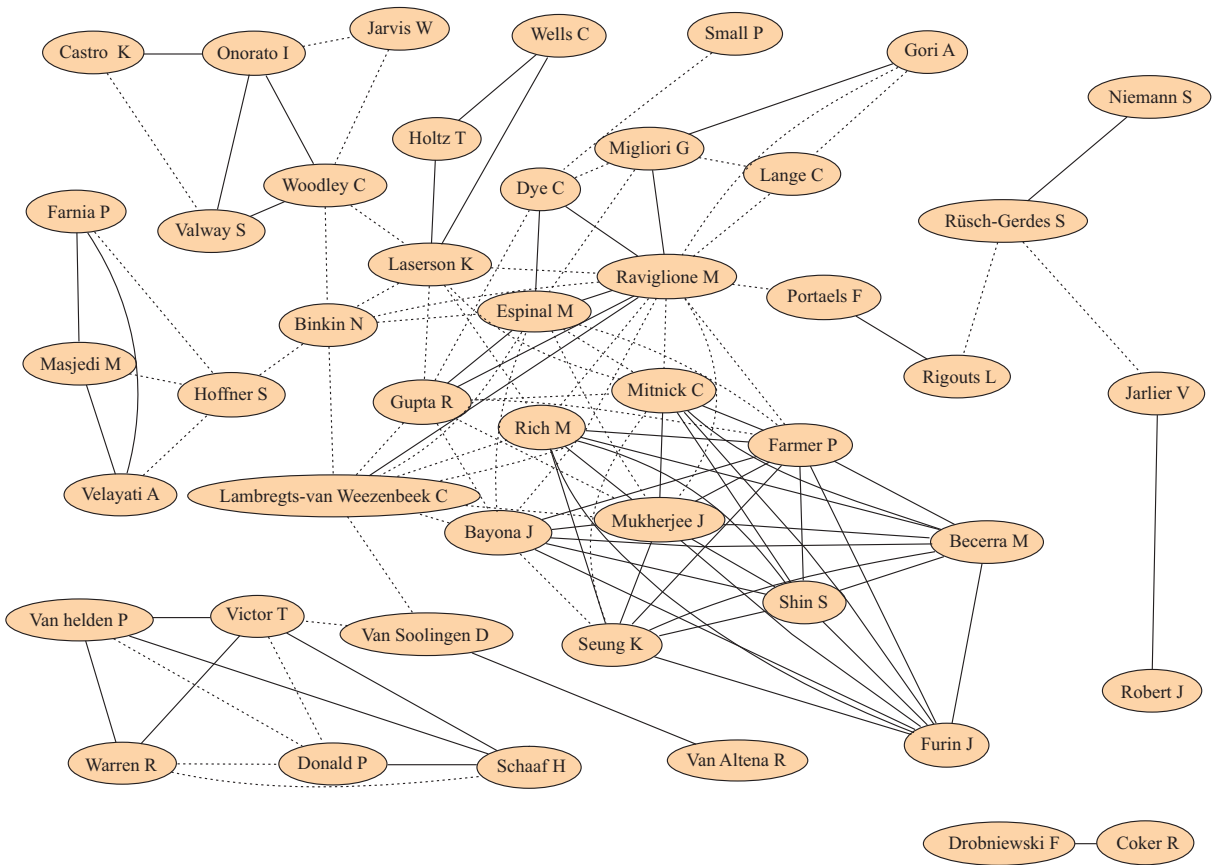


图 3 耐多药结核外文文献主要研究人员研究关系网络图

2.5 文献内容分析

耐多药结核文献按照临床医学治疗研究、公共卫生管理研究、基础实验室诊断研究进行分类,中文

文献相比外文文献主要侧重于耐多药病人的治疗(69.5%),而在耐多药结核病的公共卫生(18.6%)和诊断(11.9%)方面的研究较缺乏;对中文文献发

表量排名前 10 的省市文献内容进行分析,发现各地临床医学类文献占本地文献的百分比都是最大的,但各地在公卫和实验室方面的研究比重有差异,结果如表 6、表 7 所示。

表 6 耐多药结核病国内外相关文献研究主题内容比较

文献类型	外文文献		中文文献	
	文献数量	构成比	文献数量	构成比
临床医学治疗类	1308	41.2%	1075	69.5%
公共卫生管理类	1111	35.0%	288	18.6%
基础实验室诊断类	756	23.8%	185	11.9%
合计	3175	100%	1548	100%

表 7 耐多药结核病中文文献排名前 10 的省市文献内容分布

	临床(%)	公卫(%)	实验室(%)	合计
北京	84(52.5)	58(36.3)	18(11.2)	160(100)
广东	94(72.3)	25(19.2)	11(8.5)	130(100)
河南	100(78.1)	13(10.2)	15(11.7)	128(100)
山东	78(72.9)	19(17.8)	10(9.3)	107(100)
上海	47(51.6)	25(27.5)	19(20.9)	91(100)
江苏	62(70.5)	11(12.5)	15(17.0)	88(100)
湖北	60(80.0)	10(13.3)	5(6.7)	75(100)
辽宁	55(87.3)	3(4.8)	5(7.9)	63(100)
吉林	43(76.8)	2(3.6)	11(19.6)	56(100)
浙江	35(71.4)	10(20.4)	4(8.2)	49(100)

3 讨论

3.1 文献总的计量构成情况

科学论文是某一学科学术动态的实际反映,关于耐多药结核病文献数量的变化在一定程度上反映了国内外专家学者对耐多药结核病的关注程度、科研投入、创新水平、研究成果等。我们通过对科研论文进行分析,文献计量构成主要表现以下几个特点:(1)从总的时间分布来看,关于耐多药结核病的研究是近二十年才发展起来的,随着对耐多药结核病的逐步认识和重视,国内外的研究数量均大幅增长,但近几年来国内有关耐多药结核病研究仍与世界范围内的研究存在一定的距离。(2)中文文献发表量在全国各省市的分布具有较大差异,但是初期全球基金结核病项目覆盖的广东、河南、江苏、山东、湖北等省市都在耐多药结核病的相关领域开展的研究数量

均较多,由此产出了一系列相关成果,可见政策项目导向对相关研究的开展具有较大影响;北京和上海外文文献的发表量在中国乃至世界上都比较高,且中文文献核心作者也主要来源于北京和上海,这可能与这些地区科研实力较高有关;世界上耐多药结核情况较严重的印度、中国、南非都在耐多药结核的研究上做了大量的工作,表明这些国家在对耐多药结核控制方面的重视和努力。(3)耐多药结核中文文献主要发表在《临床肺科杂志》、《中国防痨杂志》上,这与文献研究内容主要为临床治疗方面相一致,说明目前我国对于耐多药结核病的研究还主要侧重于患者的临床治疗这一块,相比世界范围的研究内容分布,在耐多药结核的预防和实验室诊断方面的研究还较不平衡,此外中文文献表期刊的影响因子不高,各地区在文献发表数量和质量上具有较大差异,今后也有待进一步改进。

3.2 文献内容分析

耐多药结核病的治疗以化学治疗为主,其基本原则是以药物敏感试验结果为依据,选择新药、敏感药,以增加一线抗结核药物和二线抗结核药物的数量组成化疗方案,关于耐多药结核病临床治疗的研究集中在三个方面:(1)化学药物的研究。关于耐多药结核的临床研究多围绕国际公认的 5 组药物展开,我国目前关于耐多药结核病化学治疗的研究多集中于包含第三组氟喹诺酮类药物(莫西沙星、氧氟沙星、左氧氟沙星)方案的疗效评价。而国际上除了常用的包含第三组氟喹诺酮类药物方案的疗效评价研究外,近年来二线抗结核药物的严重毒性作用使得临床研究的关注重点逐渐向第 5 组疗效不确切的药物转移,尤其是针对利奈唑胺和氯法齐明的研究以及各种新开发的药物的研究;(2)影响化学治疗的因素的研究,包括药物不良反应和病人依从性等;(3)耐多药结核病的综合治疗,包括外科手术治疗,免疫治疗、介入治疗等对于耐多药结核病的治疗亦有积极作用,国内还在中医疗法和病人护理方面有较多研究。

结核病诊断与实验室诊断能力的缺乏,已成为阻碍有效应对结核病及耐药性结核病挑战的关键壁垒。扩大实验室诊断能力是全球结核病控制的重点。实验室诊断内容主要包括细菌学诊断、影像学诊断、免疫学诊断、内镜介入诊断及分子生物学诊断^[6-9]。近年来,国际上研究新的耐多药结核病诊断

工具的分子生物学技术成为热点,且取得了很大成绩,集中在以全自动核酸扩增试验(NAAT)核酸扩增为核心的检测技术上,2010年12月8日,世界卫生组织认可了这种全新的结核病快速检测新方法,该检测方法在约100分钟内可为多名病人做出准确诊断,且安全方便。但另一方面,需要特殊设备、价格昂贵、需要培训等不确定性因素又制约了这些技术在基层的使用和推广的进程。目前国内耐多药结核病人的发现诊断检测仍主要采取县(区)级做涂片,地(市)级做培养,省级做药物敏感试验及初步菌种鉴定这种模式^[10-11],发展更方便、廉价、适合基层需要的及时诊断技术,是我国结核病防治工作的迫切需求。

根据 WHO 报告,2012 年,有 860 万人罹患结核病,130 万人死于结核病,世界上约有 3.7% 的新发结核病人感染了耐多药结核菌株,这一数字在以往接受过治疗的病人中更高,约为 20%^[4-5]。耐多药结核病几乎在所有接受调查的国家都存在,2007-2008 年中国结核病耐药基线调查显示,我国涂阳肺结核患者耐多药率为 8.32%,据此估算,我国每年新发生耐多药肺结核患者 12 万例^[11-13]。此外我国多个地市还进行了当地结核病耐药性基线数据调查,均表明耐多药结核病的流行目前仍是结核病控制中的一大难题和挑战^[14-16],国内外针对耐多药结核病产生的原因进行了大量研究工作,由于一系列的包括既往的治疗历史,抗结核药物的误用,治疗中患者较差的依从性,较低质量和不合格药品的提供、药物短缺和治疗监督管理不力等人为原因是导致耐多药结核病疫情产生的主要原因^[17-20],让患者接受正规的结核治疗,并且在督导员的督导下保证药物的规则使用是保证治疗成功的必要条件。世界耐多药结核病工作组根据耐多药结核病产生的原因以及各国在探索过程中积累的经验,制定了完善的针对耐多药结核病的 DOTS-Plus 策略并在国际上进行推广,包括我国在内的实施国家均发现该策略对于控制耐多药结核病具有良好的作用^[21-22]。而从全球和大部分耐多药结核病高负担国家情况看,2012 年,估计只有不到 25% 患有耐多药结核病的病人被检出,国际上结核病规划尚缺乏足够的力量来发现耐多药患者^[5]。因此,应该要求扩大(包括快速检测在内的)服务以诊断并报告病例的范围,扩大医护服务可及性,建立更好的结核病强制报告制度,才能更

好地收集报告数据。

在 2009 年耐多药/广泛耐药结核高负担国家部长会议中,世界卫生组织总干事陈冯富珍表示,“耐多药结核病仍在呈螺旋状上升,如不能得到控制,无异于一个定时炸弹或火药桶。”因此耐多药结核病的防控形势仍然十分严峻,以治疗传染源降低疫情可能难以见效,在治疗现有患者的同时,减少 MDR-TB 发生及发展更为重要,在控制过程中应重视未接受治疗患者的发现和管理,培养 MDR-TB 患者治疗依从性,减少中断治疗,必须在今后的研究工作中,预防和治疗并重,给予耐多药结核病防控科研工作足够的重视,依靠科技进步,加强科研力度,系统发展完善耐多药结核病防治长效机制,才能实现经济社会的可持续发展。

参考文献

- [1] World Health Organization. Guidelines for the programmatic management of drug-resistant tuberculosis: Emergency Update 2008. WHO/HTM/TB/2008.402. Geneva, Switzerland: WHO, 2008.
- [2] 陈品儒,王艳红,李昕洁. 耐多药结核病的综合治疗现状. 临床肺科杂志,2007(2):149-152.
- [3] World Health Organization. Multi-drug resistant tuberculosis (MDR-TB) 2013 update. WHO/HTM/TB/2013.7. Geneva, Switzerland: WHO, 2013.
- [4] World Health Organization. A ministerial meeting of high M/XDR-TB burden countries. WHO/HTM/TB/2009.415. Geneva, Switzerland: WHO, 2009.
- [5] World Health Organization. Guidelines for the programmatic management of drug-resistant tuberculosis. 2011 Update. WHO/HTM/TB/2011.6. Geneva, Switzerland: WHO, 2011.
- [6] 杨淑华,张月香. 结核病实验室诊断技术进展. 实验与检验医学,2012(6):570.
- [7] 李锋,朱敏. 结核病的实验室诊断技术. 国际呼吸杂志,2006(10):793-794.
- [8] 刘毅. 耐多药结核病研究进展. 中国现代医生,2013(21):12.
- [9] 弭凤玲,王黎霞,李亮,等. 中国全球基金耐多药结核病项目阶段性实施结果分析. 中国防痨杂志,2010(11):700-704.
- [10] 周纯辉,侯双翼,张玉,等. 湖北省全球基金耐多药结核病项目阶段性实施结果分析. 中国预防医学杂志,2012(10):755-758.
- [11] 张立强,程斌,宋大平,等. 我国耐多药肺结核病纳入新型农村合作医疗补偿政策现状与思考. 中国初级卫生保健,2013(2):14-16.
- [12] 中华人民共和国卫生部. 全国结核病耐药性基线调查报告

- (2007—2008 年).北京:人民卫生出版社,2009,30.
- [13] 王黎霞,成诗明,陈明亭,等. 2010 年全国第五次结核病流行病学抽样调查报告. 中国防痨杂志,2012(8):485-508.
- [14] 李恩江,付萍,史同禄,等. 哈尔滨市耐多药结核病流行病学调查. 临床肺科杂志,2003(3):269-270.
- [15] 缪梓萍,何海波,柳正卫,等. 浙江省初始耐药结核病流行趋势. 疾病监测,2009(3):187-189.
- [16] 于宏杰,孙思飞,周浩,等. 耐多药结核病的流行病概况及控制策略. 上海医药,2013(14):30-32.
- [17] Migliori GB, D'Arcy M, Sotgiu G, et al. Multidrug-resistant and extensively drug-resistant tuberculosis in the West. Europe and United States: epidemiology, surveillance, and control. *Clinics in Chest Medicine*, 2009, 30(4): 637-65.
- [18] Matteelli A, Migliori GB, Cirillo D, et al. Multidrug-resistant and extensively drug-resistant *Mycobacterium tuberculosis*: epidemiology and control. *Expert Review of Anti-Infective Therapy*, 2007, 5(5): 857-71.
- [19] He GX, Zhao YL, Jiang GL, et al. Prevalence of tuberculosis drug resistance in 10 provinces of China. *BMC Infectious Diseases*, 2008(8): 166.
- [20] 王胜芬,赵冰,宋媛媛,等. 我国耐药结核病的危险因素—2007 年全国结核病耐药基线调查资料分析. 中国防痨杂志, 2013(4):221-226.
- [21] 李亮. 从 DOTS 到 DOTS-plus—耐多药挑战及控制. 中华医学会结核病学分会. 耐多药结核病诊断与治疗研讨会资料汇编. 中华医学会结核病学分会, 2005:7.
- [22] 屠德华. 实施耐多药结核病控制策略遏制耐多药结核病的流行. 中华结核和呼吸杂志, 2006, 29(8): 507-508.

Bibliometric Analysis of Multidrug-resistant Tuberculosis Literature at Home and Abroad

Zhaoyu Ying, Xiaodong Tan, Bei Liu, Zhiming Yue

Wuhan University School of Public Health, Wuhan 430071, China

Abstract: To objectively evaluate the development and the academic trends about multidrug-resistant tuberculosis (MDR-TB) and to provide scientific basis for the future investigation. Scientific literature retrieval about MDR-TB was carried out through the VIP, ChianInfo, CNKI, Chinese Biomedical Literature Database (CBM), PubMed database. Literature metrological analyses were conducted after screening according to inclusion and exclusion criteria by NoteExpress software and Excel software. Totally, 1548 Chinese articles and 3175 English articles were finally included. The first article about MDR-TB originally published in 1993; China ranked fourth in the amount of published literature around the world, of which Beijing and Shanghai made the greatest contribution. The articles were classified according to the clinical, public health and basic research, compared to English articles, Chinese articles paid more attention to clinical treatment, the constituent ratio were 69.5%, 41.2%. The studies about MDR-TB started late with a short history, and the present studies focus on clinical research rather than both treatment and prevention. In the future scientific research, equal attention should be paid to the prevention and the therapy about MDR-TB to develop the systematic and efficient long-acting mechanism to control it.

Key words: MDR-TB; drug resistance; tuberculosis; literature metrology

意大利区域医疗绩效评估系统述评

黎 浩^{1,2}, 刘庭芳³, 董四平^{4,5}

1. 意大利圣安娜大学管理学院管理与健康系, 比萨 56127; 2. 武汉大学公共卫生学院/武汉大学全球健康研究中心, 武汉 430071;
3. 清华大学医院管理研究院, 北京 100084; 4. 卫生部医院管理研究所, 北京 100082
5. 武汉大学政治与公共管理学院, 武汉 430072

摘要: 区域医疗绩效评估对于优化整个地区的医疗资源配置, 提高医疗服务的质量、效率和公平性, 从而改善整个地区的健康状况, 具有重要的推动作用。我国医院管理机构、社区卫生服务管理机构的出现和发展使得开展区域医疗绩效评估成为可能。但是我国还缺乏相应理论支撑和实践基础, 需要借鉴国际经验。由于意大利托斯卡纳大区的经验比较典型, 对我国构建区域医疗绩效评估系统具有较强的借鉴意义, 本文通过从多个方面详细剖析其区域医疗绩效评估系统开发应用经验及评估系统的不足, 为中国开发自有区域医疗绩效评估系统作参考。

关键词: 区域医疗; 绩效评估系统; 多维报告; 绩效标杆; 意大利

中国医疗系统长期以来一直存在效率低下、卫生资源投入不足、分布不均衡等突出问题, 影响经济社会和谐发展。新一轮医改中, 很多城市公立医院纷纷从多部门管理中独立出来, 由专门的医院管理机构统一管理(如上海申康、无锡医院管理局、北京医院管理局等)。同时, 各级政府正在大力建设社区卫生服务中心, 开始实行绩效工资制。所有这些改革为开展区域医疗绩效评估、优化医疗资源配置、提升医疗系统的绩效创造了一定条件。但是, 中国在这些方面的研究和实践还存在很大不足, 而意大利托斯卡纳大区的医疗系统是意大利 21 个大区(自治省)中绩效最好的系统之一, 值得我们研究和借鉴。但是, 医疗卫生领域关于意大利对中国借鉴意义的研究, 大都局限于医疗体制、医疗保险、医疗事故处理等方面的探讨^[1-4]。医疗绩效评估方面, 除了笔者借鉴意大利的经验从绩效评估机制、绩效评估机构和绩效评估法律规章三个方面研究中国如何建立自有城市绩效评估体系外^[5], 再无文献深入探讨。因此, 本文继续剖析托斯卡纳大区的区域医疗绩效评估系统, 供中国开发自有区域医疗绩效评估系统作借鉴。

1 绩效评估系统实施背景

托斯卡纳大区的行政区划相当于中国一个省, 面积(约 2.3 万平方公里)和人口规模(约 352 万)相当于中国的一个特大型城市。托斯卡纳大区的医疗服务主要由 12 所本地卫生局和 5 所教学医院提供。本地卫生局由以前的本地卫生单位改制而成, 直接为本地居民提供预防服务、基本医疗服务及医院服务。教学医院由大学与大区政府共同管理, 为本地居民提供医院服务及疑难病症诊治服务。为了便于表述, 下文把本地卫生局和教学医院统称为医疗机构。从 2001 年开始, 意大利卫生部大力鼓励各大区自行开发卫生信息系统, 用来监管医疗机构提供服务的有效性和公平性^[6]。托斯卡纳大区的信息系统, 可以自动收集医疗机构上报的大量标准数据和信息。但是大部分这类数据和信息都未能得到充分利用、呈现形式不简洁, 不足以支持决策过程, 不利于医疗机构的管理。因此, 大区府决定设计和实施一种可以强调医疗机构产出结果的绩效评估系统。为了保证评估系统的可用性、准确性和透明性,

收稿日期: 2014-02-05; 修回日期: 2014-02-24

作者简介: 黎浩, 意大利圣安娜大学管理学院管理与健康系博士, 武汉大学公共卫生学院、武汉大学全球健康研究中心讲师

通讯作者: 黎浩, 武汉大学公共卫生学院、武汉大学全球健康研究中心。E-mail: haolix@gmail.com

2001 年大区政府决定委托给具有多学科研究背景、专业的健康管理知识以及与医疗机构之间无业务关联的意大利圣安娜大学并联合组建管理与健康系作为第三方专业医疗绩效评估机构,选取 4 家医疗机构进行绩效评估系统的设计与试点。由于试点效果良好,2006 年绩效评估系统在各医疗机构得到全面运行。

2 绩效评估指标体系

托斯卡纳大区区域医疗绩效评估系统的评估维度及指标体系设计源于平衡计分卡法(BSC)并在此基础上进行了创新,通过输出医疗机构的指标绩效值来进行标杆,形成多维结果报告的区域医疗绩效评估系统。系统从 6 个维度评价各医疗机构的绩效,6 个

维度分别强调医疗机构绩效的基本面,它们分别是:

①人口健康状况(A)。该维度选取婴儿死亡率、癌症死亡率、潜在寿命损失等指标来评价。

②大区政策目标(B)。该维度用来保证大区战略能及时地以所陈述的方式实现。

③临床服务质量(C)。该维度包括质量、得体性、效率、临床风险等。

④病人满意度(D)。该维度包括公众、服务接受者对医疗机构所提供的医疗服务进行评估。

⑤员工评估(E)。该维度主要处理各类员工满意度,深化临床绩效并强调效率。

⑥效率与财务绩效(F)。该维度对每个医疗机构从事经济与财务活动的的能力进行验证,对检验年度进行准确描绘和趋势评估。这 6 个维度又被进一步分解成 50 个主指标和 130 个分指标,如表 1^[7]。

表 1 部分托斯卡纳大区医疗绩效评估系统主指标(2009 版)

人口健康状况(A)		病人满意度(D)	
A1 婴儿死亡率		D1 病人对儿科医生的满意度	
A2 癌症死亡率		D2 病人对全科医生的满意度	
A3 传染病死亡率		D3 病人对普通门诊的满意度	
A4 自杀死亡率		D4 病人对诊断服务的满意度	
A5 潜在寿命损失		D8 病人对急救部的满意度	
A6 健康生活方式		D9 急诊部撤回率	
		D10 对急诊部的不满意度	
大区政策目标(B)		员工评估(E)	
B3 门诊服务的等待时间		E1 内部氛围调查反馈率	
B4 止痛药的消耗率		E2 缺勤率	
B5 癌症筛查		E3 事故发生率	
B6 器官捐赠		E9 培训活动	
B7 疫苗覆盖率		E10 员工对管理层的满意度	
B8 数据报送大区信息系统的及时性		E11 员工对沟通和信息的满意度	
B9 公平性和医疗服务的普及性			
B12 吸引能力(仅对教学医院)			
B14 诊断服务的等待时间			
B16 公众沟通与参与度			
临床服务质量(C)		效率与财务绩效(F)	
C1 住院率		F1 财务生存能力	
C2 住院活动的效能评估		F3 资产负债管理	
C3 外科手术活动之前的效率评估		F10a 药品支出控制	
C4 外科手术的得体性评估		F11 跨区就医净流入回报率	
C5 住院临床质量评估		F12 药物处方有效性	
C6 风险管理与病人安全评估		F15 预防服务于工作场所安全	
C7 妇幼过程评估		F16 食品安全与营养	
C8 基本医疗质量评估		F17 人均医疗费用	
C9 药物处方得体性			
C11 慢性病治疗质量评估			
C13 门诊与诊断服务率			
C14 医药适用性评估			
C15 心理健康			

资料来源:圣安娜大学管理与健康系 2010 年大区绩效评估报告

3 多维报告

为了恰当呈现医疗机构六个维度的指标结果，评估系统采用蛛网的形式，分五种不同颜色的评估带进行结果报告，如图 1^①。评估带的划分参考国际标准与大区标准设定，由内到外分别为深绿、浅绿、黄、橙、红色。所有指标按各自不同算法从评估测定值转化为 1~5 的绩效标准值，集中体现在蛛网图中。深绿色带离网心最近，表示优秀绩效，得分介于 4 和 5 之间；浅绿色带表示良好绩效，得分介于 3 和

4 之间；黄色带表示一般绩效，得分介于 2 和 3 之间，尚有大量的改进空间；橙色带表示较差绩效，得分介于 1 和 2 之间，必须进行改进；红色带表示很差绩效，得分小于 1，必须进行整改。医疗机构的指标绩效值离网心越近（深绿色带），就表示绩效越高。大区层面上，管理与健康系负责把各医疗机构的指标数据汇总，并形成托斯卡纳大区区域医疗绩效蛛网图(图 2)。对于未在医疗机构全部实施的指标，数据只体现在医疗机构蛛网图中。对于应用于所有医疗机构的指标，则进一步体现在大区医疗绩效蛛网图中。

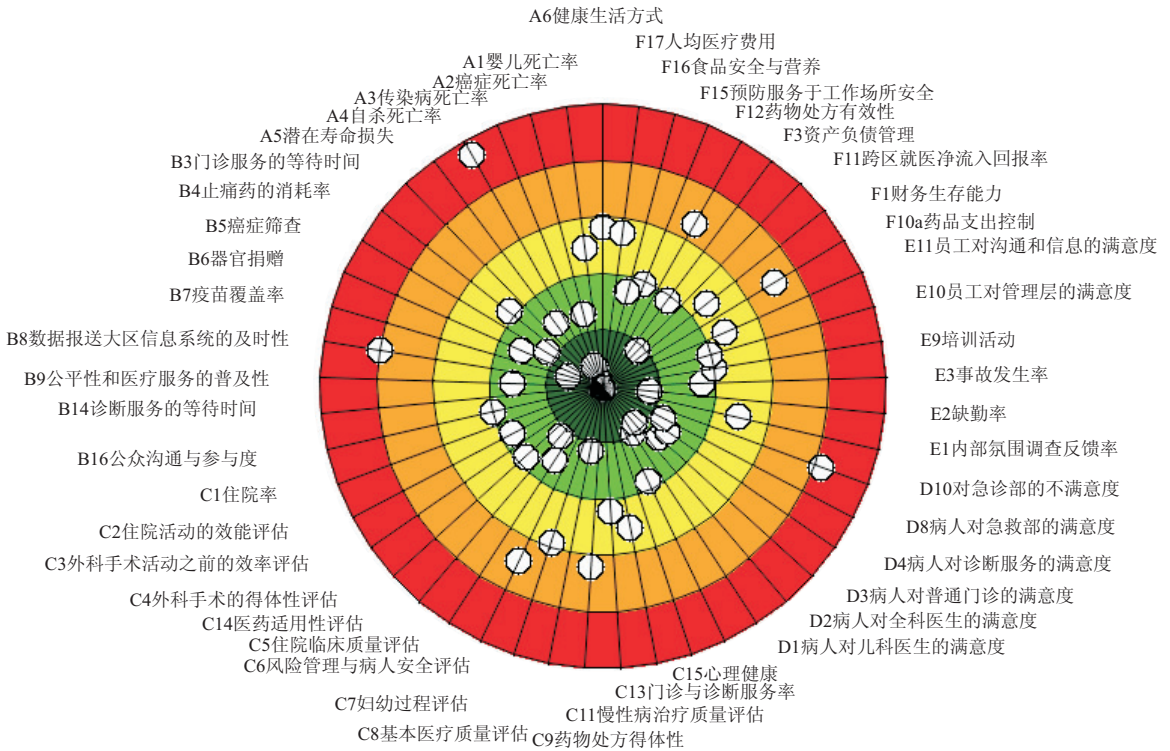


图 1 托斯卡纳大区某医疗机构绩效蛛网图(2009 年)
资料来源:圣安娜大学管理与健康系 2010 年绩效评估报告

4 指标体系的选取与指标测定

托斯卡纳评估系统指标体系的选取基于国际、国家及地区标准。在缺少可参考的标准时以大区平均水平作为参照。试点初期，先由绩效评估机构、大

区政府及医疗机构提出一系列指标建议，然后经过大区政府代表与医疗机构 CEO、专家、病人代表反复讨论并达成一致，最后由大区政府批准。另外，每年新加入的指标也要通过这一流程来确定。

为了更好地理解指标体系的测定方法，现以效率与财务绩效维度中的“药品支出控制”指标 F10a

① 本文所有关于托斯卡纳的指标和绩效图形、图表，已经作者处理为相应的中文版本，并隐去了具体医疗机构信息。

(图 3) 为例进行说明。表 2 是该主指标的构成,由地方人均药品支出 F10(图 4)和医院每住院天药品

支出 F10.2 这两个分指标组成。F10a 指标的绩效值由这 2 个分指标绩效值加权汇总,分指标权重重大

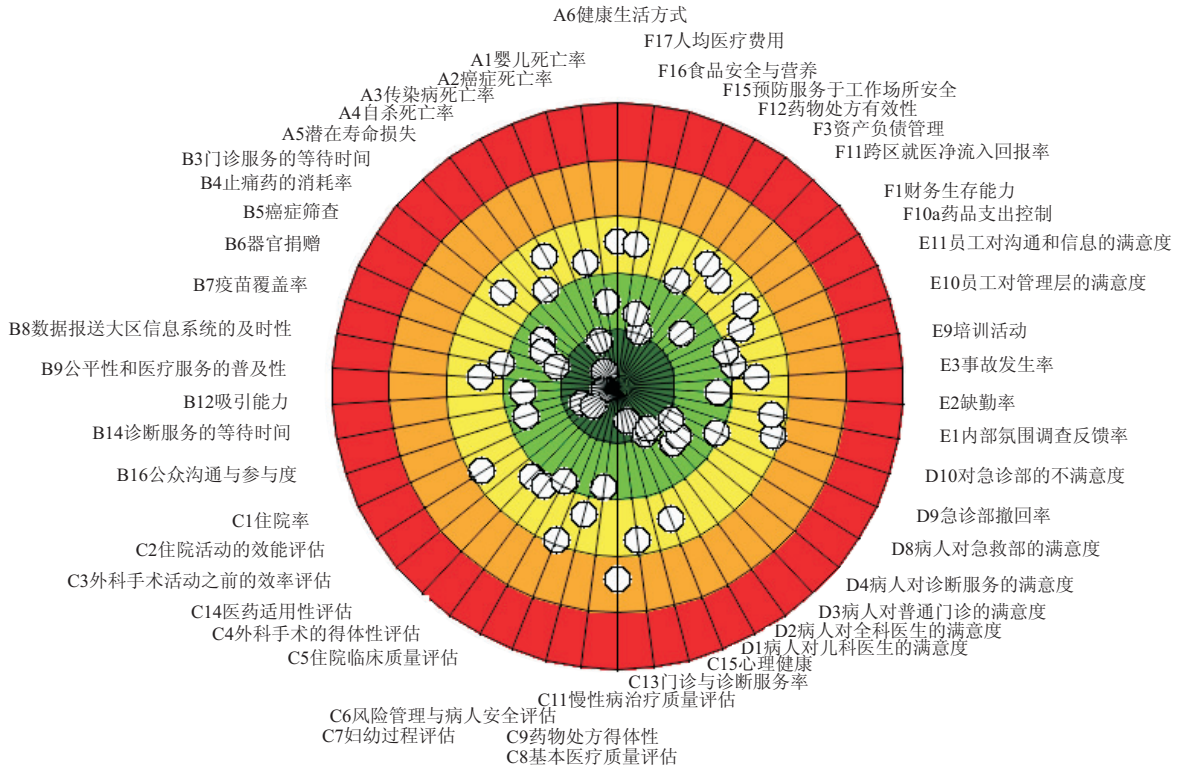


图 2 托斯卡纳大区绩效蛛网图(2009 年)

资料来源:圣安娜大学管理与健康系 2010 年大区绩效评估报告

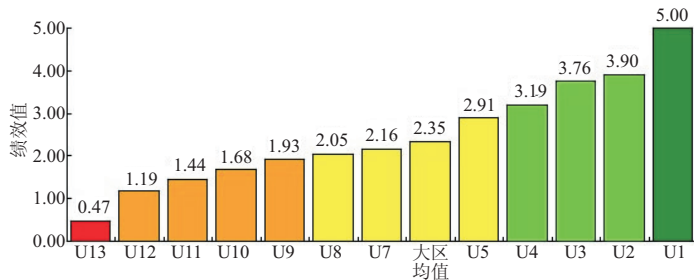


图 3 药品支出控制指标 F10a

资料来源:圣安娜大学管理与健康系 2010 年绩效评估报告

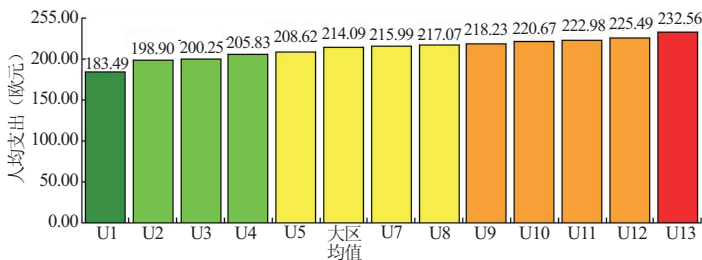


图 4 医院每住院天数人均药品支出指标 F10

资料来源:圣安娜大学管理与健康系 2010 年绩效评估报告

小由大区政府、管理与健康系专家委员会、本地卫生局等利益相关者共同讨论确定。

6 结束语

托斯卡纳大区区域医疗绩效评估系统在意大利取得了空前的成功。大区政府通过委托第三方专业绩效评估机构开展区域医疗绩效评估,运用标杆管理来持续改善绩效并统筹规划卫生资源。绩效评估系统已成为大区政府医疗机构治理的重要工具,系统产生的评估报告是大区政府进行预算规划的重要参考依据。自 2008 年开始,管理与健康系促进了绩效评估系统在其它大区的发展,构建了跨大区的绩效评估网络,以便对绩效的系统分析和对比可以在大区与大区之间进行。加入这一评估网络的大区都采用了基本一致的指标体系。截止 2010 年底,意大利共有 9 个大区加入了托斯卡纳的绩效评估网络。评估系统在单个医疗机构层面、大区层面、甚至全国层面的应用对提升医疗绩效都产生了显著的作用。

托斯卡纳大区的医疗绩效评估系统并非一步到位。为了完善整个系统的指标体系,管理与健康系每年对指标体系进行调整和完善,合适的指标被加进系统,不合适的指标在下期中不再使用,这是系统从不完善向完善迈进的持续创新过程。但是,绩效评估系统的实施和运行过程中也暴露了一些问题和不足,仍需完善的方面有:

- 绩效评估系统考虑了效率、质量和适用性,但还需开发更多有效指标来评价医疗机构的绩效。
- 绩效评估系统对于基本医疗的绩效评估基于间接数据,从家庭医生直接获取数据比较困难,这使得临床路径缺乏相应的信息和数据支持。
- 如何处理与绩效指标有关的绩效投机、数据操纵等现象,还需要继续探索。医疗机构 CEO 通常对提到和强调的指标予以重点关注,而对没有提到的方面未给予足够重视。
- 大区政府缺乏适当的干预机制来变更甚至解聘能力不足的医疗机构 CEO 的职务。
- 大区政府对医疗机构 CEO 的浮动工资考核额度偏低,只占到总收入的 20% 左右,影响对变革和创新的激励效果。
- 家庭医生与国家 NHS 签订就业协议,独立于本地卫生局或教学医院,CEO 没有权力解聘不努力工作的医生^[19]。
- 评估对象是公立医疗机构,而私立医疗机构

表 2 药品支出控制指标 F10a 构成

分指标	指标描述	指标定义
F10	地方人均药品支出	$\frac{\text{优惠药支出} + \text{直售药支出}}{\text{经过折算后的 2009 年 1 月 1 日人口数}}$
F10.2	医院每住院天药品支出	$\frac{\text{医院用药支出}}{\text{住院总天数}}$

资料来源:圣安娜大学管理与健康系 2010 年绩效评估报告

5 绩效标杆

绩效标杆在绩效评估系统中得到了广泛的应用。评估系统统一产生的指标绩效值不仅可供医疗机构就历年绩效数据进行自我参照对比,还可以在医疗机构之间进行有效和结构化的对比(表 3)。管理与健康系每季度对绩效指标进行跟踪并召开工作会。大区行政长官和所有医疗机构高管(CEO、健康主任、财务主任)都要出席例行的工作会。工作会上一系列绩效指标得到评论,重要改进得到关注。取得显著成绩的医疗机构 CEO 会被要求介绍具体经验。在图 3 中,U13 的绩效值最低,属于很差绩效,必须根据分指标 F10 和 F10.2 的绩效影响因素进行改进,改进效果将直接体现在下期指标绩效中。这些医疗机构的 CEO 可以通过工作会向处于优秀绩效的 U1 及处于良好绩效的 U2、U3、U4 的医疗机构 CEO 学习成功经验。

表 3 医疗机构人均药品支出

医疗机构	2008 年	2009 年	偏差百分数	分子(2009)	分母(2009)
大区均值	219.15	214.09	-2.309	793,816,698	3,707,818
U8	218.19	217.07	-0.513	45,202,483	208,243
U13	225.65	232.56	3.062	51,590,205	221,833
U5	218.02	208.62	-4.312	59,434,944	284,890
U1	205.15	183.49	-10.558	41,863,258	228,153
U10	224.54	220.67	-1.724	73,035,399	330,965
U12	223.64	225.49	0.827	81,161,713	359,932
U3	208.75	200.25	-4.072	55,339,025	276,356
U11	228.93	222.98	-2.599	75,840,457	340,122
U4	215.34	205.83	-4.416	48,498,809	235,623
U9	225.36	218.23	-3.164	180,611,829	827,628
U2	197.71	198.90	0.602	45,117,866	226,838
U7	213.35	215.99	1.237	36,120,711	167,235

资料来源:圣安娜大学管理与健康系 2010 年绩效评估报告

没有纳入评估范畴。

参考文献

- [1] 匡远深. 意大利的医疗健康服务网络. 中华医院管理杂志, 1999, 15(11): 703-704.
- [2] 李颖, 杨一帆. 意大利的医疗卫生体系. 医院院长论坛, 2007, (4): 60-63.
- [3] 李恒, 高蕾, 樊立华. 意大利医疗事故立法简介及借鉴意义. 中国卫生法制, 2011, 19(1): 52-55.

- [4] 杨存, 郑晓瑛, 陈曼莉. 意大利医疗保障体系建设及启示. 中国卫生经济, 2011, 30(5): 94-96.
- [5] Li H, Barsanti S, Bonini A. Building China's municipal health-care performance evaluation system: A Tuscan perspective. *International Journal for Quality in Health Care*. 2012; 24(4): 403-410.
- [6] Scalzo AL, Donatini A, Orzella L, et al. Italy: Health system review. *Health System in Transition*. 2010; 11(6): 87-88.
- [7] Laboratorio Management e Sanità. Il sistema di valutazione della performance della sanità toscana-Report 2010. Pisa: Edizioni ETS, 2010.

The Italian Regional Healthcare Performance Evaluation System: A Review and Commentary

Hao Li^{1,2}, Tingfang Liu³, Siping Dong^{4,5}

1. Scuola Superiore Sant'Anna, Institute of Management, Pisa 56127, Italy;
2. Wuhan University School of Public Health, Global Health Institute, Wuhan 430071, China;
3. Tsinghua University Hospital Management Institute, Beijing 100084, China;
4. The Ministry of Health Hospital Management Institute, Beijing 100082, China;
5. Wuhan University School of Political Science and Public Administration, Wuhan 430072, China

Abstract: Regional healthcare performance evaluation system can optimize healthcare resources allocation on regional basis and improve the quality, efficiency and equity of healthcare services provided, thus facilitating health status improvement of a region. The advent of hospital managing institutions and institutions of community health service centers in China makes it possible to conduct regional healthcare performance evaluation. However, China still lacks of relevant supporting theories and practices and therefore needs to learn from international experience. As the Tuscan experience in Italy is a good example and has some implications to build China's own regional healthcare performance evaluation system, in this paper, the Tuscan regional healthcare performance evaluation system is analyzed in detail for its system development and aspects to be improved. It can serve as China's reference to develop its own regional healthcare performance evaluation system.

Key words: Regional health care; performance evaluation system; multi-dimensional reporting; performance benchmarking; Italy

The Role of Early Life Nutrition in Obesity Prevention^{*}

Colin Binns¹, Mi Kyung Lee², Rongxian Xu³

1. Curtin University School of Public Health, Perth 00301J, WA;
2. Murdoch University Nutrition School of Health Professions, Perth 6150, WA;
3. Fujian Medical University School of Public Health, Fuzhou 350108, China

Abstract: Obesity rates have increased rapidly throughout the world with more than 900 million adults having a body mass index of greater than 25. As the increase in obesity is beginning in infants and pre-school age children, there has been increasing emphasis on risk factors for obesity in early life, reinforced by increasing interest in the Developmental Origins of Health and Disease (DOHAD) hypothesis. Prenatal nutrition is important with weight gain and birthweight related to subsequent obesity. The promotion of exclusive breastfeeding, reducing prelacteal feeds and the appropriate use of complementary foods remain the best public health strategies for controlling future obesity.

Key words: Obesity; prevention; nutrition; infancy

1 Introduction

A recent report from the Overseas Development Institute summarises the increase in obesity and overweight as a world-wide public health problem^[1]. A total of 904 million people in developing countries are now classed as overweight or obese, with a BMI of more than 25, up from 250 million in 1980, comparing to 557 million in high-income countries. While during the same period, the global population nearly doubled. In Asian, childhood nutrition problems have traditionally been related to under nutrition and specific micronutrient deficiencies. But around three decades ago the situa-

tion began to change and there are now substantial numbers of obese children. In Asia (excluding Japan), nearly 5% of preschool children were estimated to be overweight or obese in 2010, a 50% increase in prevalence since 1990^[2]. In 2010, the obesity rates of preschooler were higher in Western Asia (which includes the Middle East) than that in Eastern, South-eastern, or South Central Asia (15%, 5%, 5%, and 4% respectively). But because of the large populations in India and China, the actual number of overweight and obese infants is very large^[2]. However the collection of statistics is hampered in many countries owing to the varying definitions in use^[3]. Different studies report using different definitions of obesity and different

Received: 2014-02-09; **Revised:** 2014-02-21

^{*} Paper presented at the 45th APACPH Conference hosted by the School of Public Health at Wuhan University, October, 2013.

Author: Colin Binns, John Curtin distinguished professor of public health, Curtin University; Mi Kyung Lee, senior lecturer in nutrition school of health professions, Murdoch University; Rongxian Xu, professor, department of nutrition and food security, Fujian Medical University

Corresponding Author: Colin Binns, School of Public Health, Curtin University. E-mail: c.binns@curtin.edu.au

techniques and standards of measurement. The International Obesity Taskforce provides more details of the distribution of obesity in Asia in its databases^[4]. Despite difficulties in measurement it is estimated that the obesity rate in children in China has increased above its historical levels, from 1-2% in the 1980s to a situation where currently 20% is not unusual in the cities^[5].

The Developmental Origins of Health and Disease (DOHAD) hypothesis has become an important theme in paediatrics and highlights the relationships between early life growth (and other developmental factors) and lifetime health^[6]. The idea that nutrition and other factors early in life can influence growth and health in later life is not new, but the hypothesis has become widely accepted only in the past few decades. The term ‘programming’ originated from Germany and the concept was subsequently developed by Barker^[7]. The original studies on which Barker based his hypothesis involved a cohort of men and women born in Hertfordshire between 1911 and 1920. Follow-up of the cohort about 50 years later showed that those who had a low birthweight were more likely to die of coronary heart disease or to develop metabolic syndrome^[8]. Originally, the hypothesis related early life nutrition (prenatal), as reflected in weight at birth, to subsequent disease patterns. The hypothesis has been further developed and refined to include not only birthweight but also body leanness at birth and growth during childhood^[9]. The relationship between early life nutrition and growth is U-shaped, with underweight and obesity having lasting effects on health. Understanding of early influences on later diseases has expanded to encompass the concepts of metabolic programming, developmental plasticity and the new science of epigenetics^[10-12]. They provide a theoretical basis for understanding for patterns of chronic disease. Public health nutrition interventions should emphasize the health of mothers and prenatal care to minimise the number of low-birthweight babies

and thin babies (ponderal index <26) and also the number of high birthweight infants ($>4000\text{G}$). In early childhood, programs to avoid under-nutrition or the development of overweight or obesity during childhood would minimise rates of chronic disease.

2 The importance of definitions in assessing obesity

Ideally obesity would be defined on the basis of short and long term predisposition to morbidity and mortality. For adults in Western countries, there are numerous studies over many decades that have been used to define the current classification using BMI. In non-Caucasian societies the evidence suggests that limits for obesity should be lower to reflect the differences in body fat composition. For children it is a different matter and many different definitions are in use throughout Asia^[5]. One approach has been to extrapolate from the adult values of BMI, an approach endorsed by the International Obesity Task Force^[13,14]. However, it is not known if adjustment should be applied to this classification to reflect non-Caucasian children. The alternative approach used is to select a percentile or Z score value on a specific growth reference to determine the proportion of children suffering from obesity. One of the problems with this approach has been the change in the growth references in use in different countries. In 2006 the WHO introduced its new growth standard. The rate of growth of the children included in the standard was higher in the first six months of life and then slightly lower after 12 months of age. This has the effect of decreasing the proportion of children classified as suffering from malnutrition, but increasing the proportion suffering from obesity over the age of 12 months^[15,16]. Before comparing rates of obesity across time or geographical location, it is important to examine the definitions used, sample selection, response rate and measurement protocols.

Overweight (excluding obesity) and obesity

prevalence has now stabilised in some developed countries. In Australia the rate has reached 21% in school age children, but has plateaued for the past decade^[17]. In the children of Dutch, Moroccan and Surinamese and South Asian ethnicity have stable or declining rates of overweight or obesity, but not the children of Turkish origin^[18]. In this study they used the revised IOTF cutoff levels of BMI for children^[14]. However, for most part of Asia obesity rates are still rising in all socio-economic strata. Since it is far easier to prevent obesity than it is to treat it, and the public health emphasis should be on prevention. In this brief review some of the major issues in early life nutrition and the development of obesity will be considered.

Monasta and Cattaneo reviewed the early life factors associated with obesity several years ago^[19]. Factors associated with later overweight and obesity include maternal diabetes and smoking, rapid infant growth, no or short breastfeeding, obesity in infancy, short sleep duration, low levels of physical activity and consumption of sugar-sweetened beverages^[19].

3 Perinatal Factors

3.1 Birth weight

Low birth weight is defined as a birth weight of a liveborn infant of less than 2500g and high birth weight more than 4000g regardless of gestational age^[20]. Monitoring the incidence of low birth weight is important for the development of perinatal medicine. Low birth weight and high birth weight not only directly affect the incidence of neonatal morbidity and mortality, but also have strong relations to long-term health outcomes in childhood and adults. In the history of China, low birth weight rates and neonatal mortality were very high but with the increasing economic development and improved education and health services these rates have declined^[21]. The low birth weight rate in China is now reported to be one of the lowest in

the world at 3 per 1000 live births, and even as long ago as 1976 it was as low as 4.7% in Shanghai^[22]. However recent reports suggest that it is likely to be more similar to other developed countries at around 6%^[23]. Low birth weight followed by rapid growth during infancy is associated with obesity and chronic diseases^[24]. In recent decades there has been a trend towards an increasing number of births greater than 4000 grams that has corresponded to the secular trend in increasing birth weight in China and the current rate is 6.9% of births^[25,26]. Higher birth weights are associated with obesity later in life with all of the problems associated with being overweight^[27,28]. A meta-analysis of birth weight and hypertension in adult life shows an inverse relationship, particularly with systolic blood pressure^[29]. Recent data from the UK provide the strongest evidence by far that paternal diabetes is associated with lower birthweights, whereas maternal diabetes is associated with increased birthweight^[30]. Either outcome is not optimal for lifetime health.

The incidence of Caesarean section has increased rapidly in Asia, and has reached rates as high as 80% in some Chinese cities. Being born by caesarean section is associated with obesity. A large Chinese birth cohort study (n = 181000) found a modest association between caesarean section and obesity. Possible explanations for this may be related to increased use of infant formula in these infants or to changes in the human microbiome^[31]. Several studies have reported association between parental smoking during and after pregnancy and later obesity^[32,33]. There may be a direct effect of smoking or the effect could be moderated by the link between maternal and paternal smoking and lower rates of breastfeeding^[34,35].

3.2 Infant feeding

Infant feeding is potentially modifiable by health promotion interventions and maternal support. There have been many recent reviews of the value of breastfeeding to infant and adult health

and its role in the prevention of obesity^[36,37]. The US Surgeon General tabulated the excess health risks associated with not breastfeeding in Table 1 and estimated the excess risk of obesity in non-breastfed infants to be 30%.

The National Health and Medical Research Council gave a Grade A rating to the evidence that breastfeeding, especially prolonged breastfeeding is associated with the lowest risk of later obesity^[37]. However the causality will never be proven because it is unethical to randomize women to a formula-feeding arm. Therefore, there is still some debate on the role of breastfeeding in the prevention of obesity. Casazza and colleagues suggest that the existing data indicate that breastfeeding does not have important antiobesity effects on children, instead, it has other important potential benefits for the infant and mother and should therefore be encouraged^[38]. However, an editorial in JAMA Pediatrics made the case for the public health perspective that there is enough evidence that breastfeeding does prevent obesity and it should be strongly promoted because of its many benefits including higher cognitive development scores^[39,40].

Table 1 Excess health risks associated with not breastfeeding

<i>Among full-term infants</i>	<i>Excess Risk (%)</i>
Acute ear infection (otitis media)	100
Eczema (atopic dermatitis)	47
Diarrhoea and vomiting (gastrointestinal infection)	178
Hospitalisation for lower respiratory tract diseases in the first year	257
Asthma, with family history	67
Asthma, no family history	35
Childhood obesity	32
Type 2 diabetes mellitus	64
Acute lymphocytic leukaemia	23
Acute myelogenous leukaemia	18
SIDS	56
<i>Among preterm infants</i>	
Necrotising enterocolitis	138
<i>Among mothers</i>	
Breast cancer	4
Ovarian cancer	27

* The excess risk is approximated using odds ratios. Source:^[36]

3.3 Infant Formula

In the very rare occasions that a mother is unable to breastfeed her baby and other sources of human breastmilk are not available, then infant formula remains the best alternative^[41]. The amino acid content infant formula differs from human breastmilk and a higher protein level is required to meet minimum amounts of specific amino acids, especially tryptophan. A major well-conducted, randomised, controlled trial of lower protein formula undertaken in Europe concluded that a 'higher protein content of infant formula is associated with higher weight in the first two years of life but has no effect on length. Lower protein intake in infancy might diminish the later risk of overweight and obesity'^[7,42]. Since the publication of this study, the quality of the protein in many brands of infant formula in Europe has been improved, enabling the overall protein levels to be reduced. A review of links between protein levels of infant formula and cow's milk and obesity and chronic disease in adulthood is now available^[43]. This evidence suggests that the preferable levels of protein in formula to promote appropriate growth rates should be similar to the levels in human milk, subject to a minimum content of specific amino acids^[44]. Human breast milk contains 1-1.1 g protein per 100 mL and infant formulas with levels as close to this as possible should be preferred in order to reduce the risk of obesity.

3.4 The introduction of solid foods

The World Health Organisation and almost all governments and pediatric societies recommend 'exclusive breastfeeding' until six months of age, with no liquids or solids aside from breastmilk and medications. Unfortunately this is not often achieved in China or other countries in the region^[45,46]. Infancy is the period of most rapid growth in weight, height and all the developmental parameters. Appropriate growth during infancy protects against stunting at one extreme and obesity at the other^[47]. There are increasing evidences of the importance of

growth and nutrition in relation to obesity rates and cognitive development^[47]. By around 6 months of age breastmilk (or infant formula) no longer provides sufficient nutrients and energy for growth and development, but continues to be a major source of bioavailable nutrients. At around six months the introduction of nutrient dense complementary foods that are culturally acceptable is important. Introduction of complementary feeds earlier than this may reduce breastmilk production and predispose to obesity. For infants over 6 months of age, drinking water is preferable to fruit juices and other caloric drinks.^[48] Excess consumption of fruit juice by young children has also been associated with gastrointestinal symptoms, failure to thrive, decreased appetite, loose stools, failure to gain weight, and at the other end of the growth spectrum, increased rates of obesity.^[49] Breastmilk and water have been the only traditional fluids given to infants and the body does not allow for calories ingested in a liquid form (Popkin 2010). The promotion of potentially unhealthy food and drinks is now recognised in Europe as a significant risk for child obesity and for developing diet-related non-communicable diseases^[1].

3.5 Energy expenditure

It is important to encourage exercise and reduced sitting time from an early age to reduce obesity. There is now research that shows the importance of reducing the amount of sitting time, such as watching television, as well as increasing exercise^[50,51]

4 Conclusion

The first step in an obesity prevention program is to ensure that all mothers have the opportunity to breastfeed their infants, exclusively for six months and then continue while complementary food are introduced. Infants who are not breastfed are one third more likely to become obese children. Preventing obesity in children requires regular mo-

onitoring of growth and introducing appropriate complementary foods after six months of age. The avoidance of infant formula, prelacteal food and early complementary food (before six months) are important public health strategies for the prevention of obesity. As a part of health promotion programs, health workers and parents need to be educated on the importance of appropriate growth and a healthy diet as the basis of a healthy life. Programs designed to achieve the goals of improved maternal and child nutrition can be justified on many grounds, having no downside, and should therefore be promoted without waiting for further evidence.

References

- [1] Keats S, Wiggins S. Future diets: Implications for agriculture and food prices. London: Overseas Development Institute, 2014.
- [2] de Onis M, Blossner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. *American Journal of Clinical Nutrition*, 2010, 92(5): 1257-1264.
- [3] Chen S, Binns CW, Zhang YX. The Importance of Definition in Diagnosing Obesity: A Review of Studies of Children in China. *Asia-Pacific Journal of Public Health*, 2012, 24(2): 248-262.
- [4] International Obesity Taskforce. [2014-01-11]. World obesity database (<http://www.iaso.org/iotf/obesity/?map=children>).
- [5] Chen S, Binns CW, Zhang Y. The importance of definition in diagnosing obesity: a review of studies of children in China. *Asia-Pacific journal of public health / Asia-Pacific Academic Consortium for Public Health*, 2012, 24(2): 248-262.
- [6] Binns CW, Lee M, Scott JA. The fetal origins of disease hypothesis: public health implications for the Asia-Pacific region. *Asia Pacific Journal of Public Health*, 2001, 13(2): 68-73.
- [7] Koletzko B, von Kries R, Closa R, et al. Can infant feeding choices modulate later obesity risk? *The American Journal of Clinical Nutrition*, 2009, 89(5): 1502S-1508S.
- [8] Barker D. Mothers, babies and health in later life. Edinburgh: Churchill Livingstone; 1998.
- [9] Godfrey KM, Barker DJP. Fetal programming and adult health. *Public Health Nutrition*, 2001, 4(2): 611-624.
- [10] Solomons NW. Developmental origins of health and disease:

- concepts, caveats, and consequences for public health nutrition. *Nutrition Reviews*, 2009, 67 Suppl 1: S12-16.
- [11] Waterland RA. Epigenetic epidemiology of obesity: application of epigenomic technology. *Nutrition Reviews*, 2008, 66 Suppl 1: S21-23.
- [12] Waterland RA, Michels KB. Epigenetic epidemiology of the developmental origins hypothesis. *Annual Review of Nutrition*, 2007, 27: 363-388.
- [13] Cole TJ, Bellizzi MC, Flegal KM, et al. Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ*, 2000, 320 (7244): 1240-1243.
- [14] Cole TJ, Lobstein T. Extended international (IOTF) body mass index cut-offs for thinness, overweight and obesity. *Pediatric Obesity*, 2012, 7(4): 284-294.
- [15] Binns C, Lee M. Will the new WHO growth references do more harm than good? *Lancet*, 2006, 368(9550): 1868-1869.
- [16] Binns C, Lee M. New growth standards. *Lancet*, 2007, 370 (9598): 1542-1542.
- [17] Olds TS, Tomkinson GR, Ferrar KE, et al. Trends in the prevalence of childhood overweight and obesity in Australia between 1985 and 2008. *International Journal of Obesity*, 2010, 34(1): 57-66.
- [18] de Wilde JA, Verkerk PH, Middelkoop BJ. Declining and stabilising trends in prevalence of overweight and obesity in Dutch, Turkish, Moroccan and South Asian children 3-16 years of age between 1999 and 2011 in the Netherlands. *Archives of Disease in Childhood*, 2014, 99(1): 46-51.
- [19] Monasta L, Batty GD, Cattaneo A, et al. Early-life determinants of overweight and obesity: a Review of Systematic Reviews. *Obesity reviews: an official journal of the International Association for the Study of Obesity*, 2010, 11(10): 695-708.
- [20] Schellong K, Schulz S, Harder T, et al. Birth weight and long-term overweight risk: systematic review and a meta-analysis including 643, 902 persons from 66 studies and 26 countries globally. *PLoS One*, 2012, 7(10): e47776.
- [21] Oestergaard MZ, Inoue M, Yoshida S, et al. United Nations Inter-Agency Group for Child Mortality, E., the Child Health Epidemiology Reference, G. Neonatal mortality levels for 193 countries in 2009 with trends since 1990: a systematic analysis of progress, projections, and priorities. *PLoS Medicine*, 2011; 8(8): e1001080.
- [22] Chalmers I. Better perinatal health. Shanghai. *Lancet*, 1980, 1 (8160): 137-139.
- [23] Chen Y, Li G, Ruan Y, et al. An epidemiological survey on low birth weight infants in China and analysis of outcomes of full-term low birth weight infants. *BMC Pregnancy and Childbirth*, 2013, 13(1): 242.
- [24] Eriksson JG, Forsen T, Tuomilehto J, et al. Early growth and coronary heart disease in later life: longitudinal study. *BMJ*, 2001, 322(7292): 949-953.
- [25] Koyanagi A, Zhang J, Dagvadorj A, et al. Macrosomia in 23 developing countries: an analysis of a multicountry, facility-based, cross-sectional survey. *Lancet*, 2013, 381(9865): 476-483.
- [26] Lu Y, Zhang J, Lu X, et al. Secular trends of macrosomia in southeast China, 1994-2005. *BMC Public Health*, 2011, 11: 818.
- [27] Yu ZB, Han SP, Zhu GZ, et al. Birth weight and subsequent risk of obesity: a systematic review and meta-analysis. *Obesity Review*, 2011, 12(7): 525-542.
- [28] Zhao Y, Wang SF, Mu M, et al. Birth weight and overweight/obesity in adults: a meta-analysis. *European Journal of Pediatrics*, 2012, 171(12): 1737-1746.
- [29] Mu M, Wang SF, Sheng J, et al. Birth weight and subsequent blood pressure: a meta-analysis. *Archives of Cardiovascular Diseases*, 2013, 105(2): 99-113.
- [30] Tyrrell JS, Yaghoobkar H, Freathy RM, et al. Parental diabetes and birthweight in 236 030 individuals in the UK Biobank Study. *International Journal of Epidemiology*, In Press 2013.
- [31] Thompson AL. Developmental origins of obesity: early feeding environments, infant growth, and the intestinal microbiome. *American Journal of Human Biology: the Official Journal of the Human Biology Council*, 2012, 24(3): 350-360.
- [32] Timmermans SH, Mommers M, Gubbels JS, et al. Maternal smoking during pregnancy and childhood overweight and fat distribution: the KOALA Birth Cohort Study. *Pediatric Obesity*, In Press 2013.
- [33] Wang L, Mamudu HM, Wu T. The impact of maternal prenatal smoking on the development of childhood overweight in school-aged children. *Pediatric Obesity*, 2013, 8(3): 178-188.
- [34] Giglia R, Binns CW, Alfonso H. Maternal cigarette smoking and breastfeeding duration. *Acta Paediatrica*, 2006, 95(11): 1370-1374.
- [35] Xu F, Binns C, Zhang H, et al. Paternal smoking and breastfeeding in Xinjiang, PR China. *Journal of Human Lactation: Official Journal of International Lactation Consultant Association*, 2010, 26(3): 242-247.
- [36] U. S. Department of Health and Human Services. The Surgeon General's Call to Action to Support Breastfeeding. Washington, DC: Department of Health and Human Services Office of the Surgeon General, 2011.
- [37] National Health and Medical Research Council. Infant Feeding Guidelines for Health Workers. www.nhmrc.gov.au. Canberra: NHMRC, 2012.
- [38] Casazza K, Fontaine KR, Astrup A, et al. Myths, presumptions, and facts about obesity. *New England Journal of Medicine*, 2013, 368(5): 446-454.
- [39] Bovbjerg ML, Amador C, Uphoff AE. Breastfeeding and

- Childhood Obesity: Where Do We Go From Here? *JAMA Pediatrics*, IN Press 2013.
- [40] Kramer MS, Aboud F, Mironova E, et al. Breastfeeding and child cognitive development; new evidence from a large randomized trial. *Archives of General Psychiatry*, 2008, 65(5): 578-584.
- [41] WHO. Acceptable medical reasons for use of breastmilk substitutes. Geneva; WHO, 2009.
- [42] Koletzko B, von Kries R, Closa R, et al. Lower protein in infant formula is associated with lower weight up to age 2 y: a randomized clinical trial. *The American Journal of Clinical Nutrition*, 2009, 89(6): 1836-1845.
- [43] Michaelsen KF, Larnkjaer A, Molgaard C. Amount and quality of dietary proteins during the first two years of life in relation to NCD risk in adulthood. *Nutrition, Metabolism, and Cardiovascular Diseases*, 2012, 22(10): 781-786.
- [44] Escribano J, Luque V, Ferre N, et al. Effect of protein intake and weight gain velocity on body fat mass at 6 months of age: the EU Childhood Obesity Programme. *International Journal of Obesity*, 2012, 36(4): 548-553.
- [45] Binns CW, Lee MK, Tang L, et al. Ethical issues in infant feeding after disasters. *Asia-Pacific journal of public health / Asia-Pacific Academic Consortium for Public Health*, 2012, 24(4): 672-680.
- [46] Xu F, Qiu L, Binns CW, et al. Breastfeeding in China: a review. *International Breastfeeding Journal*, 2009, 4: 6.
- [47] Ip S, Chung M, Raman G, et al. Evidence report on breastfeeding in developed countries. Washington: Agency for Healthcare Research and Quality, 2007.
- [48] Faith MS, Dennison BA, Edmunds LS, et al. Fruit juice intake predicts increased adiposity gain in children from low-income families: weight status-by-environment interaction. *Pediatrics*, 2006, 118(5): 2066-2075.
- [49] Jones HF, Butler RN, Moore DJ, et al. Developmental changes and fructose absorption in children; effect on malabsorption testing and dietary management. *Nutrition Reviews*, 2013, 71(5): 300-309.
- [50] Katzmarzyk PT, Lee IM. Sedentary behaviour and life expectancy in the USA: a cause-deleted life table analysis. *BMJ*, 2012, 2(4).
- [51] Katzmarzyk PT, Shen W, Baxter-Jones A, et al. Adiposity in children and adolescents: correlates and clinical consequences of fat stored in specific body depots. *Pediatric Obesity*, 2012, 7(5): e42-61.