



DIRE NECESSITY AND TRANSFORMATION: ENTRY-POINTS FOR MODERN SCIENCE IN ISLAMIC BIOETHICAL ASSESSMENT OF PORCINE PRODUCTS IN VACCINES

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ABSTRACT

The field of medicine provides an important window through which to examine the encounters between religion and science, and between modernity and tradition. While both religion and science consider health to be a 'good' that is to be preserved, and promoted, religious and science-based teachings may differ in their conception of what constitutes good health, and how that health is to be achieved.

This paper analyzes the way the Islamic ethico-legal tradition assesses the permissibility of using vaccines that contain porcine-derived components by referencing opinions of several Islamic authorities. In the Islamic ethico-legal tradition controversy surrounds the use of proteins from an animal (pig) that is considered to be impure by Islamic law. As we discuss the Islamic ethico-legal constructs used to argue for or against the use of porcine-based vaccines we will call attention to areas where modern medical data may make the arguments more precise. By highlighting areas where science can buttress and clarify the ethico-legal arguments we hope to spur an enhanced applied Islamic bioethics discourse where religious scholars and medical experts use modern science in a way that remains faithful to the epistemology of Islamic ethics to clarify what Islam requires of Muslim patients and healthcare workers.

INTRODUCTION

Modernity, globalization and technological advancements challenge religious systems to revisit their traditional doctrines and ethical codes in order to provide guidance for contemporary society. The dialogue between tradition and modernity is readily apparent in biomedicine where scientific advancements present novel ethical challenges to patients, healthcare workers, and society at large.

Religious scholars are often sought out by patients and health professionals for ethical guidance and their bioethical writings provide insight into the dialectic methods, as well as the practical counsels, a particular religious tradition offers to its adherents vis-a-vis bio-

medicine. By examining these discussions we further glean how religious scholars view the world around them; we come to understand the technoscientific imagination with which the scholars approach modernity.¹ Analyzing the particular ethico-legal constructs used by scholars to approach questions motivated by scientific advancements opens up the possibility for bioethics stakeholders to uncover areas where scientific knowledge informs ethico-legal assessment. Recognizing how scientific data is understood, and used, by religious authorities to derive ethical positions is critically important to an informed dialogue that maintains fidelity to both science and

¹ G.E. Marcus. 1995. *Technoscientific Imaginaries: Conversations, Profiles, and Memoirs*. 2nd edn. Chicago: University of Chicago Press.

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tradition, and yields coherent ethical guidance to religious adherents on the ground.

In this paper we review Islamic ethico-legal arguments about the permissibility of using vaccines that contain porcine components through the writings of several contemporary Islamic authorities. After presenting the arguments and juridical tools employed, we highlight several areas where scientific knowledge may impact the frames of ethical debate. We conclude by calling for a renewed applied Islamic bioethics discourse that better incorporates scientific data while remaining true to the epistemological paradigm of Islamic ethics.

THE SCIENCE AND BENEFITS OF VACCINATION

The development of vaccination science has been one of the greatest breakthroughs of modern medicine. From the eradication of smallpox to the decrease in the global incidence of polio and diphtheria, and the prevention of hepatitis and influenza spread, vaccines have contributed to a widespread reduction in human morbidity and mortality. Vaccines, therefore, remain a ubiquitous and integral part of the public health armamentarium.

Vaccines typically consist of three components: an antigen, a delivery system, and immune potentiators.² The antigen is comprised of the disease-causing vector, a bacteria or a virus, that is grown upon an animal or vegetable protein medium and is systematically weakened or destroyed. Sometimes a protein that simulates the disease-causing agent is used instead of the entire antigen. The antigen is next packaged within a delivery system consisting of other proteins and solvents.³ These proteins and solvents maintain the antigen in a weakened state while at the same time preserving it for inoculation.⁴ Immune potentiators may also be added to the vaccine in order to stimulate immune response mechanisms.

The health benefits of vaccination operate on two levels. An individual level benefit occurs through being exposed to a weakened antigen. This exposure allows one's body to develop immune system machinery that better combats the disease. Accordingly, an individual's morbidity and mortality from the disease vaccinated against is reduced. The community-level benefit is termed herd immunity and represents a reduction in the number of people being at risk of catching the disease. In other words, when a critical portion of the community is vaccinated, then there is a reduced chance of exposure to the disease as the risk of outbreak is minimized. As a result

even those who abstain from vaccination obtain health benefits from public vaccination programs.⁵

The clear public health benefits of vaccines have allowed state authorities to institute vaccination mandates even while allowing for religious and conscious-based exemptions. Thus, children enrolling in school, adults pursuing certain types of employment, and persons journeying to fulfil religious rites such as the pilgrimage to Mecca (Hajj), may all be required to obtain specific vaccines.

Lastly vaccine manufacture, marketing, delivery, and research is a multinational, multilayered, and financially costly enterprise. Pharmaceutical companies spend tens of millions of dollars on vaccine research, development and marketing, and hundreds of vaccines are researched before one makes it to human testing and eventual government approval processes. Even after a vaccine comes to market, state authorities continue to spend millions of dollars to monitor vaccine safety in perpetuity. The immense infrastructure and time-intensive processes associated with vaccines makes the industry a true 'big' business with many vested stakeholders.

ISLAMIC BIOETHICAL DELIBERATION

Before we delve into the Islamic bioethical arguments around porcine-based vaccines, defining a few key concepts and terms is necessary. First our analytic vantage-point is that of applied Islamic bioethicists. Applied Islamic Bioethics is a discipline that considers the Islamic ethico-legal tradition to be the source of normative goals in health behaviors and medical practice.⁶ This field is somewhat distinct from the practice of using the Islamic ethico-legal tradition to derive rulings pertinent to biomedicine (as in Islamic bioethics), and from the study of Muslim ethical behaviours during the course of medical care using social science approaches (as in Muslim bioethics). Rather, applied Islamic bioethics straddles both by connecting both Islamic to Muslim bioethics. Accordingly applied Islamic bioethics seeks (1) to examine the way in which Islamic authorities approach ethical questions raised by Muslim healthcare providers, religious leaders, and patients in their dealings with medicine and biotechnology, using Islamic juridical sources as a window into this discourse, and (2) to study the application of these source-materials by healthcare providers, patients, and healthcare stakeholders. The source-material for applied Islamic bioethics inquiry are ethico-legal opinions (*fatawa*, sing. *fatwa*) of Islamic

² J.B. Ulmer, U. Valley, & R. Rappuoli. Vaccine manufacturing: challenges and solutions. *Nat Biotechnol* 2006; 24(11): 1377–1383.

³ Ibid.

⁴ G.S. Marshall. *The vaccine handbook: a practical guide for clinicians* 2004, Philadelphia: Lippincott Williams & Wilkins.

⁵ NIAID. 2010. Community Immunity ('Herd' Immunity). *Health & Research A to Z* 2010. Available from: <http://www.niaid.nih.gov/topics/pages/communityimmunity.aspx>. [Accessed 14 Mar 2012]

⁶ A.I. Padela, H. Shanawani, & A. Arozullah. Medical Experts & Islamic Scholars Deliberating over Brain Death: Gaps in the Applied Islamic Bioethics Discourse. *Muslim World* 2011; 101(1): 53–72.

jurisconsults and verdicts (*qararat*) issued by groups of Islamic jurisconsults. These pronouncements are the subjects of study in accordance with the first aim of applied Islamic bioethics. The human actors whose behaviors are informed by *fatawa* and *qararat* are objects for applied Islamic bioethics inquiry meeting the second aim of applied Islamic bioethics.

With that in mind, this paper analyzes how several Islamic authorities address the permissibility for Muslims to use vaccines that contain porcine proteins. Our primary Islamic bioethics source is the juridical opinion of the Islamic Organization for Medical Sciences (IOMS). The IOMS is a premier transnational council of medical scientists and Islamic jurisconsults that specifically deliberates on bioethical issues, and its verdicts have been used to inform health policy in both the Muslim and the non-Muslim world.⁷ To clarify and further explain the ethico-legal arguments and tools employed by the IOMS we reference several classic compendia of Sunni legal opinions and ethico-legal opinions of a few prominent Islamic jurisconsults. It is possible that *fatawa* from other sources may employ different arguments and yield different conclusions. However, the sources we cite reflect common views on the question at hand and sufficiently cover aspects of Islamic ethico-legal reasoning and juridical constructs that are relevant to a discussion of where medical science can inform Islamic bioethical reasoning. Given the lack of a central repository of Islamic bioethical verdicts and the inherent plural nature of *fatwa*-making an exhaustive review of Islamic opinions on the matter is methodically challenging and beyond the scope of this paper.

Lastly, while a review of the methodology and tools of Islamic ethico-legal deliberation is beyond the scope of this paper, a brief overview will help the reader to situate the reasoning employed.⁸ Islamic ethico-legal deliberation corresponds to the usage of *usul-al-fiqh*, literally the sources of (Islamic) understanding. *Usul-al-fiqh* both identifies the sources of law and lays down the discursive rules for weighing these sources against each other in ethico-legal assessment. Indeed an ethico-legal opinion (*fatwa* or *qararah*) must, by definition, be grounded in *usul-al-fiqh*.⁹ The Islamic sources, *usul*, are classified into two broad categories: sources which are agreed upon by Islamic scholars, and sources that are contested. The sources that are agreed upon are four, of which two are material and two are formal. The material sources are the

Qur'an, believed to be the literal word of God revealed to the Prophet Muhammad, and the *Sunnah*, which are the sayings, actions and silent affirmations of the Prophet Muhammad. These *sunnah* are recorded in collections of narrations called *hadith*. *Ijma* and *qiyas* are the two formal sources that are more or less agreed upon by the four major schools of Sunni law (*Hanafi*, *Shafi*, *Maliki* and *Hanbali*). *Ijma* refers to a scholarly consensus about the assessment of an act or practice, while *qiyas* involves precedence-based reasoning by analogy.¹⁰

If the primary *usul* leave the matter indeterminate, and when further support is needed for a particular ethico-legal assessment derived from the *usul*, Islamic jurisconsults may resort to arguments based on the higher objectives of Islamic law (*maqasid*, *sing. maqsad*) or ethico-legal maxims and principles (*qawaid*, *sing qaida*). Jurists differ on the importance and application of specific *maqasid* and *qawaid*. Importantly both *maqasid* and *qawaid* are used in secondary fashion to calibrate ethico-legal assessments derived from the *usul*. In other words they are only referred to as primary sources when the *usul* are silent or leave the matter indeterminate.¹¹

In summary, the task of the jurisconsult, or juridical committee, is to formulate an ethico-legal assessment by paying attention to what the sources of Islamic law (*usul*) state about the matter and how these *usul* are prioritized by *usul al-fiqh*, and then reference the objectives of the law (*maqasid*) and principles of the Islamic ethico-legal structure (*qawaid*) in their assessment as necessary.

VACCINATIONS WITH PORCINE COMPONENTS – PERMISSIBLE FOR MUSLIM USE?

Working through an *usul*-based paradigm for ethico-legal assessment guidance is first sought from the *Qur'an* and *Sunnah*. A *Qur'anic* verse states

Say (O Prophet): I find not in that which is revealed unto me aught prohibited to an eater that he eat thereof, except it be carrion, or blood poured forth, or swine-flesh for that verily is foul or the abomination which was immolated to the name of other than Allah. But whoso is compelled (thereto), neither craving nor transgressing, (for him) Lo! your Lord is Forgiving, Merciful [6:145].¹²

⁷ L. Al-Nasser. 2009. The Islamic Fiqh Academy. *Asharq Alawsat* 9 July; *Religious Leaders' Approval of Use of Vaccines Containing Porcine Gelatin*. 2003. John Hopkins Bloomberg School of Public Health. Available from: <http://www.vaccinesafety.edu/Porcine-vaccineapproval.htm>. [Accessed 8 Feb 2012]

⁸ A.I. Padela. Islamic Medical Ethics: a Primer. *Bioethics* 2007; 21(3): 169–178.

⁹ T. Ramadan. 2004. *Western Muslims and the Future of Islam*. New York: Oxford University Press.

¹⁰ M.H. Kamali. 2003. *Principles of Islamic jurisprudence*. 3rd revised edn. Cambridge, UK: Islamic Texts Society; A. Yacoub. 2001. *The Fiqh of Medicine*. London: Ta-Ha Publishers Ltd.

¹¹ K. Abdur-Rashid, S. Furber & T. Abdul-Basser. Lifting the Veil: A Typological Survey of the Methodological Features of Islamic Ethical Reasoning on Biomedical Issues. *Theor Med Bioeth* 2013. In press.

¹² M.W. Pickthall. 2005. *The Meaning of the Glorious Qur'an*. Beltsville, MD: Amana publications.

This verse prohibits consuming pig and the extra description of ‘for that verily is foul’ uses the Arabic pronoun, *hu*, to refer back to the word swine indicating that the animal itself, and not just its flesh, is impure. On the basis of this verse pig is deemed *najas al-ayn*, essentially filthy, and every part of it be it meat, hair or bones, is considered impure according to the majority of opinions within the Hanafi, Shafi and Hanbali schools of law. The Malikis consider its flesh to be impure but other parts pure while alive.¹³ Even while forbidding the eating of pig the verse offers an exception: one may eat normatively prohibited foodstuffs under duress. Clarifying this exception Islamic scholars hold that an individual may partake of pig under a state of dire necessity, *darurah*, and can only partake of enough meat to stave off death.

Moving from the Qur’an to the Prophetic *sunnah*, we find several statements of the Prophet recommending against seeking cures in proscribed foodstuffs. The first notes ‘Allah has not placed a cure for your diseases in things that He has forbidden for you.’¹⁴ The second relates: ‘Allah has sent down both the malady and its remedy. For every disease He has created a cure. So seek medical treatment, but never with something the use of which Allah has prohibited.’¹⁵ The first *hadith* is considered more authentic than the second, but since both statements share the same meaning and cohere with the Qur’anic missive, a normative ruling is generated: a Muslim is not to take medicine that contains proscribed substances.

This judgement is further supported by the Islamic attitude towards seeking medical care in general. The majority of Islamic scholars opine that seeking medical treatment is recommended but not obligatory.¹⁶ They consider it an obligation to seek medical treatment only when the condition is life threatening and the treatment is assuredly life-saving.¹⁷

On the basis of the textual arguments above, Islamic authorities deem the use of porcine-based medicines to be normatively prohibited. This view is espoused by the medieval jurist Ibn Taymiyyah, is the standard

position in the Hanafi and Hanbali schools of law, and is evidenced in the fatwa of several contemporary jurists.¹⁸ There also considerable debate as to whether pig organs, e.g. pig valves, can be used for therapeutic purposes in xenotransplantation, based on similar arguments about the purity of pig parts.¹⁹

Exceptions to the norm are derived from considering the higher objectives of Islamic law in circumstances of dire necessity, and by considering secondary *usul*. Two instances during the time of the Prophet provide evidence for exemptions. The most relevant instance involved his permitting tribesmen to consume camel urine (also considered *najas*) as medication. Additionally the Prophet allowed some of his companions to wear silk garments while afflicted by a skin malady even though he had declared silk clothes to be unlawful for men.

Using these exemptions as the basis for precedent-based analogy, *qiyas*, some scholars consider having a disease to motivate an exception to the rule and thus allow for the use of porcine-based products over the course of medical care. These scholars seem to consider a dire necessity, *darurah pl. darurat*, to exist when people are ill and substantiate their view by alluding to the legal maxim, *al-darurat tubih al-mahzurat* – dire necessity renders the impermissible to be permissible. This qaida itself is derived from Qur’anic verses and *hadith*. Particularizing the maxim, all four Sunni schools of law allow a dire necessity, *darurah*, that threatens a core objective of the Islamic law to overturn a normative prohibition. These core objectives, *maqasid*, of the Islamic ethico-legal code are the protection of religion, life, intellect, lineage, and property. To these five some authorities add a sixth, the protection of honor.²⁰

Defining what constitutes a dire necessity is controversial and can vary from Islamic jurisconsult to jurisconsult and from legal school to school.

For example Shaykh al-Qaradawi who heads the European Council for Fatwa and Research requires that three conditions be met prior to using porcine products in medical treatment (1) the medicine must be necessary for the life of the individual taking it; (2) a knowledgeable and trustworthy Muslim physician must recommend it and (3) there must be no alternative medicines that are

¹³ S. Younas. *Pork Gelatin: Permissible or Not?* 2010. Available from: www.seekerguidance.org/ans-blog/2010/04/15/pork-gelatin-permissible-or-not/. [Accessed 1 Feb 2011]

¹⁴ M. Al-kawthari. *Using Unlawful (haram) Medication*. Available from: http://www.daruliftaa.com/question?txt_questionid=q-12212298 [Accessed 30 Jan 13].

¹⁵ Abū Dā’ūd Sulaymān ibn al-Ash’ath & A. Hasan. 1984. *Sunan Abu Dawud*. 1st edn. Lahore: Sh. M. Ashraf; Sijistani, A. *Kitab al-Tibb*, in *Sunan Abi Dawud* 2011.

¹⁶ Yacoub, *op. cit.* note 10.

¹⁷ A.F.M. Ebrahim. 2006. End of Life Issues: Making Use of Extraordinary Means to Sustain Life, in *Geriatrics and End of Life Issues: Biomedical, Ethical and Islamic Horizons*. H.E. Fadel, M.A.A. Khan & A.A. Mishal, eds. Jordan: Jordan Society for Islamic Medical Sciences Federation of Islamic Medical Associations: 49–77; Yacoub, *op. cit.* note 12.

¹⁸ A. Ibn Qudamah. 1994. In *al-Mughni*. Beirut: Dar al-Kutub al-‘Ilmiyyah; F. Rabbani. *Using Gelatine in Medicine*. 2005; Available at http://qa.sunnipath.com/issue_view.asp?HD=1&ID=453&CATE=29

[Accessed 2012 March 3]; al-Munajjid, M. *Medicines Containing Animal Hormones/Organs/Products*. 2004; Available at: http://www.hdcglobal.com/publisher/global_fatwa <http://islamqa.info/en/ref/11941>. [Accessed 12 March 2012]

¹⁹ D. Atighetchi. 2007. *Islamic Bioethics: Problems and Perspectives*. International Library of Ethics, Law, and the New Medicine. New York: Springer; V. Rispler-Chaim. 1993. *Islamic Medical Ethics in the Twentieth Century*. Leiden: E.J. Brill.

²⁰ A.I. al-Shatibi. 1997. *Kitab al-Adilat al-Shar’iyyah*. In *Al-Muwafaqaat fi Usool al-Sharia*. Dar ibn ‘Affar.

made from permissible products.²¹ Similar conditions are offered by prominent Hanafi jurists.²²

Other Islamic authorities on the other hand uphold the prohibition against using proscribed products for medical treatment and disagree with using *qiyas*. Ibn Taymiyyah and others note that an individual who consumes pork to stave off starvation is assured of not dying, however a person who takes porcine medicines does not have the same confidence in being cured. Additionally he mentions that a person who starves on account of not eating normatively prohibited foodstuffs would be considered to have sinned as God grants such an individual the express permission to do so. On the other hand a person who chooses not to take impermissible medicines cannot be considered to be sinning as his action holds out the possibility of cure through God's fiat. For these and other reasons drawing an analogy between eating pork to stay alive and using pork-based medicines for health is faulty according to him.²³

In summary the use of porcine products during the course of medical treatment is normatively forbidden. This view is deduced from a Qur'anic verse prohibiting the consumption of pig and from several Prophetic statements forbidding the use prohibited substances in medicine. The scholars who allow exceptions to this prohibition do so by recourse to arguments based on *darurah* and the higher objectives of the Islamic ethico-legal code or by citing instances where the Prophet granted exemptions on account of disease.

Other Islamic opinions shift the conversation away from using porcine in medication to ask, when is a substance that originated from pig no longer considered to be of pig origin?

CHANGING THE IMPERMISSIBLE TO PERMISSIBLE THROUGH TRANSFORMATION (*ISTIHALA*) – DOES IT APPLY TO PORCINE PRODUCTS?

The Islamic tradition places great importance upon the purity of food. As alcohol and pork are deemed impure by the Qur'an, medieval Islamic jurists strove to ascertain

when these substances changed sufficiently in nature that the original prohibition no longer applied. Looking to the Sunnah they noted that while wine was forbidden the Prophet deemed vinegar to be a great condiment and allowed the community to consume vinegar that resulted from a transformation of wine.²⁴ Similarly, while animal skin was considered filthy, tanned skins were allowed to be used. When considering porcine-derived proteins in vaccines, the question is when, and how, does material of porcine origin change into something different during vaccine production?

Using the example of wine turning into vinegar as paradigmatic, jurists developed the construct of complete transformation, *istihala*. *Istihala* is defined as *tabdil al-mahiyyat* or *tabdil al-hal* 'changing the nature of the defiled or forbidden substance to produce a different substance in name, properties and characteristics.'²⁵ After the completion of such a process the original prohibition against consumption is lifted.

The Sunni schools of law disagree about the purification of porcine through *istihala*. The dominant opinion of the Hanafi school and the Maliki school is that *istihala* can purify pig products.²⁶ The two medieval jurists Ibn Taymiyyah, and Ibn Qayyim al-Jawziyyah also endorse this opinion, and it has been transmitted as one of the Imam Hanbal's opinions.²⁷ On the other hand, a minor opinion in the Hanafi school traced back to the major Hanafi authority Abu Yusuf does not consider *istihala* as applying to products of pig origin.²⁸ The standard Shafi view is that *istihala* does not apply to pork.²⁹ Finally, the major opinion in the Hanbali school is that *istihala* does not purify pig.³⁰

Importantly the Shafis, Hanbalis, and some Malikis do accept *istihala* as an Islamic ethico-legal construct. For them *istihala* entails a natural transformation, drawing upon the wine-vinegar analogy, and does not apply to pig products artificially transformed in vaccine production.

²⁴ A. Siddiqui. 1976. *Sahih Muslim*. Chicago: Kazi Publications.

²⁵ *Recommendations of the 9th Fiqh-Medical Seminar*. 1997. Islamic Organization for Medical Sciences: Kuwait.

²⁶ Z. Ibn Nujaym. 1983. In *al-Bahr al-Raiq*. al-Maktabah al-Majidiyah: Quetta; A. Al-Hattab. 1995. In *Mawahib al-Jalil*. Beirut: Dar al-Kutub al-'Ilmiyyah.

²⁷ Ibn Qudamah, *op. cit.* note 18, p. 76; Ibn Taymiyyah, *op. cit.* note 23, p. 70; S. Ibn Qayyim al-Jawziyyah. in *Alam al-Muwaqqi'in 'an Rabb al-'Alamin*. 1993. Dar al-Hadith: Cairo. p. 15.

²⁸ K. Ibn Humam. in *Sharh a-Fath al-Qadir*. 1995. Dar al-Kutub al-'Ilmiyyah: Beirut. p. 202.

²⁹ S. al-Shirbini. in *Mughni al-Muhtaj*. 1994. Dar al-Kutub al-'Ilmiyyah: Beirut. p. 236.

³⁰ Ibn Qudamah, *op. cit.* note 18; A.-D. Ibn 'Arafah. 2011. *Hashiyat al-Dusuqi*. Beirut, Lebanon; Dar al-Kutub al-'Ilmiyyah; M. al-Buhuti. 1394. *Kashshaf al-Qina'an Matn al-Iqna'*. Matba'ah al-Hukumah: Mecca: 214-215.

²¹ Y. al-Qaradawi. 2001. *Medicine containing alcohol for preservation purposes*. Available from: <http://www.hdcglobal.com/publisher/pid/219ab653-c702-49b4-8598-ebb11c060596/container//contentId/f7f596a7-b417-4e7d-bdb2-06df1441629e>. [Accessed 16 Mar 2012]

²² M. Al-kawthari, *op. cit.* note 14.

²³ I. Abidin. 2000. Kitbal al-Hadar wa'l ibaha In *Radd al-Muhtar 'ala al-Durr al-Mukhtar*. Dar al-Fikr; A. Ibn Taymiyyah. In *Majmu'ah al-Fatawa*. n.d., Riyad, Saudi: Maktabat al-Ma'arif; Medicinal Treatment with Unlawful Substances is Impermissible. Posted by Healthy-Muslim 25 Mar 2009. Available at: www.healthymuslim.com. [Accessed 12 March 2012]

Since porcine gelatin is the preferred antigen stabilizer in vaccines, applying the views above leads to considerable disagreement about the permissibility of porcine-based vaccines.

The Islamic Organization for Medical Sciences (IOMS) dedicated several symposia to the controversy over porcine proteins in medication. Ultimately they used *istihala* to declare medication (and thereby vaccines) containing porcine gelatin to be Islamically permissible.³¹ However the decree noted that this permission was not an ideal scenario. The verdict notes ‘the necessity of utilizing skins and bones of animals (Islamically permissible to slaughter) for the purpose of extracting gelatin.’³² Since pig is not permissible to consume and therefore cannot be slaughtered Islamically, the statement contends that using other animals constitutes a normative ideal. It follows then that even if one accepts that (i) *istihala* can render porcine products permissible to consume, and (ii) that porcine gelatin undergoes *istihala* during the vaccination processes, using a vaccine comprised of porcine gelatin is a non-normative position according to Islamic bioethics.

DEFINING NECESSITY AND TRANSFORMATION: ENTRY-POINTS FOR SCIENCE IN ISLAMIC ETHICO-LEGAL DELIBERATION

Thus far we have summarized the major ethico-legal arguments on the permissibility of Muslims taking vaccines containing porcine components. While there is variance in the particular arguments employed, the general consensus appears to be that it is impermissible to use porcine products as medication. However, in cases of dire necessity, *darurah*, the prohibition falls away. Other jurists resort to the medieval construct of *istihala* to claim that pig products undergo transformation during vaccine production and are no longer prohibited to consume.

Within the arguments there appear to be areas where scientific knowledge can clarify and add rigor to the constructs and reasoning employed. Before we highlight those areas several caveats must be offered.

The relevance of traditional *usul al-fiqh* to modern Islamic ethico-legal assessment is a topic of debate. Some Islamic studies experts suggest that Islamic ethico-legal deliberation should rely more heavily on *maqasid*-based approaches and that the traditional five (or six) cardinal *maqasid* may need to be expanded to include natural and

social science-based discoveries.³³ Others suggest that Islamic ethico-legal deliberation should draw more heavily upon the *qawaid* as a starting point and thus an Islamic principlism consonant with scientific knowledge may be in order.³⁴ Still others note that the formal tools of *usul al-fiqh* were informed by pre-modern conceptions of the world. These scholars argue that a new *usul* and/or recalibration of the *usul-al-fiqh* method is needed to meet the needs of a modern and global society.³⁵ While each critique has its merits we seek only to highlight where scientific expertise and insights may inform the traditional *usul*-based ethico-legal assessment and thereby create a platform for enhanced collaboration between medical scientists and traditional jurists and councils.

PARTICULARIZING NECESSITY ARGUMENTS IN MEDICINE-REFLECTING ON DARURAH AND UMUM AL-BALWA

The degree of certainty that is required from experts who determine matters of scientific ‘fact’ is contested within Islamic ethical theories. The epistemological approach that prevails across the Sunni ethico-legal schools is that determinations that are established on the basis of a ‘preponderance of supposition’ (*ghalabat al-zann*) – i.e. that are probabilistically established – are acceptable: absolute certainty is not required.³⁶ Nonetheless some jurists hold that in order to overturn normative prohibitions a higher degree of certainty may be required (*yaqin*).

As described above, one group of Islamic jurists hold that using vaccines with porcine products is predicated on the determination that a life-threat exists, allowing *darurah* to be invoked. The assessment of danger to life is an area where public health science may offer some insight. Vaccines reduce the morbidity from a disease at the individual-level, and limit population-level mortality from a disease by lowering transmission rates. In effect those who are most at risk of death have lower chances of either catching the disease (population-level benefit) or dying from it (individual-level benefit) because of vaccination programs. Given this backdrop one may ask what risk level represents the threshold for *darurah* to be invoked?

³³ T. Ramadan. 2008. *Islamic Ethics and Liberation*. Oxford: Oxford University Press.

³⁴ A.A. Sachedina. 2009. *Islamic biomedical ethics: principles and application*. Oxford & New York: Oxford University Press.

³⁵ E. Moosa. 2005. *Ghazālī and the poetics of imagination*. Islamic civilization and Muslim networks. Chapel Hill, NC: University of North Carolina Press.

³⁶ I. Ibn ‘Abd al-Salam. 1968. In *Qawā'id al-Ahkām fi Masāli al-Anām*. Cairo: Taha ‘Abd al-Ra’uf Sa’d.

³¹ Recommendations of the 9th, *op. cit.* note 25; Recommendations of the 8th Fiqh-Medical Seminar, 1995, Islamic Organization for Medical Sciences: Kuwait.

³² Recommendations of the 8th, *op. cit.* 31, p. 5.

Scientists have developed tools and algorithms by which to calculate an individual's risk for dying from certain diseases. Furthermore scientists are able to model population-level mortality risk associated with specific disease outbreaks. As attributable mortality risks to specific subsets of the population approach a threshold number, state authorities often institute public vaccination programs. Similar data may help to inform Islamic jurisconsults considering *darurah*-based arguments.

Additionally there are Islamic legal precedents for public hardship motivating an exemption for an entire population. Such a situation is termed *umum al-balwa*. In such a scenario, significant public harm affecting a critical proportion of the society lifts the prohibition from the whole of the populace and the exemption gains a quasi-normative status. Several *qawaid* such as *al-mushaqqqa taglabu al-tayseer* – hardship allows for bringing about ease touch upon these situations.³⁷ For public vaccination programs population-level modelling can provide insight into when conditions correspond to a state of *umum al-balwa*. Notably several Shafi' jurisconsults already cite *umum al-balwa* in their fatwa allowing for the use of gelatin in medication.³⁸

In summary public health scientists, epidemiologists and health services researchers may be able to inform the particular conditions under which an Islamic ethico-legal argument for *darurah* is active. These scientists may be able to work in concert with Islamic jurisconsults in order to provide more specific guidance to Muslim healthcare workers and patients considering porcine-based vaccines.

DEFINING ISTIHALA

As noted above, *istihala* is not a universally accepted by all Sunni legal schools. Some scholars do not accept that the pig, being *najas al-ayn*, is subject to purification via the process of *istihala*, others accept *istihala* as a means to purify pig but do not believe that pig gelatin undergoes a transformation that meets the standards of *istihala* in vaccine production. Still another group accepts *istihala* without controversy. In this area science may be able to clear up the fuzzy image of *istihala* for Islamic jurists.

Istihala is an ethico-legal concept evoked by a certain techno-scientific imaginary. Medieval Islamic jurisconsults looked at the Prophetic example of allowing vinegar to be consumed while forbidding wine, and his sanction of tanning technology while attempted to understand the nature of the process that allowed for something previously impure to become pure. This process was translated

into the ethico-legal code as the construct of *istihala*. By citing *istihala*, medieval scholars permitted Muslims to partake of salt from a salt-mine where a pig or donkey may have died. In modern times *istihala* is invoked to permit the use of vaccines with porcine products and medication packaged in gelatin capsules, and to condone the use of biological therapies created from pigs.

In part due to this ubiquitous usage of *istihala*, and as a result of advances in the chemical and physical sciences, controversy has emerged as to the 'meaning' of *istihala*. Some argue that *istihala* requires only an external change in physical properties, i.e. taste, smell, and color. Others suggest a change in chemical structure of the underlying compound e.g. saponification, equates with *istihala*. Still others claim that DNA traces of the original pig must no longer be present in order to meet the standard of *istihala*.

In this controversy science may have a role in informing the definition of an ethico-legal tool of the Islamic tradition. Scientific experts have the ability to describe the physical and chemical changes that occur when wine turns to vinegar or when animals decompose, and in so far as these changes help inform the concept of *istihala*, a dialogue between Islamic scholars, historians, and scientific experts may yield a more precise definition of the construct. Further analogies between these processes and those occurring within vaccine production may allow for more informed application of *istihala*-based arguments. Lastly, by better specifying what *istihala* is scientists may be better able to use technology to differentiate when the requirements of *istihala* are met and when they are not. While science may not be able to convince Islamic jurisconsults to accept *istihala* as a means to purify porcine products, it can inform when the concept is used in ethico-legal arguments. In such a way dialogue between scientists and Islamic scholars may lead to an enhanced techno-scientific imaginary employed within Islamic bioethical deliberation.

FINAL REMARKS

As the Islamic tradition engages modernity one area of dialogue is that between the Islamic ethico-legal tradition and modern medicine. At this interface the ethico-legal assessments of Islamic jurists and juridical bodies influence Muslim health behaviors and state health policies. Using the example of Islamic ethico-legal arguments around the use of vaccines with porcine components, we have demarcated areas where scientific experts can work with Islamic jurisconsults to inform and refine the ethico-legal argument of *darurah* and the construct of *istihala*. Using these examples as illustrative of the larger gaps in Islamic bioethical deliberation we suggest that an increased knowledge transfer between scientists and Islamic scholars is needed through multi-disciplinary

³⁷ Z. Ibn Nujaym. 1983. In *al-Bahr al-Ra'iq*. al-Maktabah al-Majidiyah: Quetta: 194.

³⁸ T. Karaan et al. 2011. Gelatin in Medicine and Vitamins. Available at: <http://www.shafiiqh.com/gelatin-in-medicine-and-vitamins/> [Accessed 16 Mar 2012].

forums on Islamic bioethics. Such forums have the potential to deliver more rigorous and applicable Islamic bioethical decisions and thereby better meet the needs of Islamic bioethics consumers at the ground-level, be they Muslim patients, healthcare providers, religious leaders or health policy actors.

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