Discussion

8.1 Overview

This final chapter discusses the main findings and limitations of this study and the implications for research policy and practice, followed by the overall conclusions.

This study focused on what methods healthcare regulatory agencies can deploy in order to achieve their objectives. Research into the effectiveness of healthcare regulation can be challenging due to the complex nature of healthcare provision, as well as the interconnected relationships between regulatory methods, the targeted behaviours and the ultimate outcomes of concern. The aim of this research was to explore the role and effects of healthcare regulation by investigating the factors that influence compliant behaviour. The central question guiding this research was:

How can regulators utilize regulatory methods to improve healthcare regulatory compliance?

The research objectives are:

1. Review the role and impact of health system reform in the United Arab Emirates (UAE) with a specific focus on Abu Dhabi;
2. Review the current availability, use and effects of a healthcare regulatory intervention (Clinical Practice Guidelines) in the Gulf region;
3. Examine the explanatory powers of several independent variables (instrumental and social motivations, as well as self-reported compliance) on compliance-related behaviours;
4. Test whether a simple behavioural cue can be effectively deployed as a regulatory method to improve compliance.

This study consisted of a systematic review of the overall context of the health system reform in the UAE and the Emirate of Abu Dhabi as well as a review of one particular regulatory method and its application in the local environment. We conducted a survey into how people who are required to comply with healthcare regulation perceive these requirements and what can be done to improve their compliance. Finally, we evaluated regulatory compliance by conducting a field experiment to measure how future healthcare professionals respond to behavioural cues.

This research study took place in the UAE, a fast developing country with relatively new healthcare system. The systematic reviews focused on first two research objectives and charted the progress and outcomes of health system reform in Abu Dhabi and the UAE, as well as the role and impact of one particular regulatory method throughout the Gulf Region, over the last decades.

The setting of the research was the UAE's oldest and best established medical school, ranked amongst the best medical schools in the Gulf Region. The medical school is the primary source of medical education for UAE nationals[1] and as such it plays an important role in the UAE healthcare system. For example, it has been estimated that only around 13% of all physicians licensed in Abu Dhabi are Emirati (around 1,200 in total)[2], many of whom graduates from the medical school involved in our study.

8.2 Research findings

This research used a mixture of methodologies to answer the research question and address each research objective. Our research study used the so-called effect chain[3] as the conceptual model in combination with the regulatory toolkit taxonomy designed by Freiberg[4], to present and explore our empirical findings

We conducted systematic literature reviews to provide an insight into the local context of health system reform in Abu Dhabi, the UAE and the wider Gulf region, with a focus on healthcare regulation. We started with a review of the recent health system reform in the Emirate of Abu Dhabi, following the introduction of a mandatory healthcare insurance system and the establishment of a regulatory authority in 2006[5]. In this review, we evaluated whether the health system reform program (including the establishment of a centralized regulatory system in Abu Dhabi) had achieved the desired effects. The study found that the new mandatory health insurance system had led to an improved situation where virtually all residents had access to the required care. However, we found no clear evidence that the introduction of a centralized regulatory system had made much impact on the quality and affordability of healthcare in Abu Dhabi (Chapter 2). Research studies conducted subsequently reached similar conclusions regarding inappropriate overutilization[6] of healthcare services, lack of information about the quality of care[7] and concerns about the long term financial sustainability[8].

As part of this phase, the research expanded into an evaluation of the entire UAE healthcare system. We conducted a systematic review, based on the AGREE tool[9], to evaluate the nature, extent and impact of the healthcare system reform since the early 2000s. The UAE, as a relatively new federation of seven independent Emirates, has made substantial progress since its establishment, with an ambitious set of plans to create one of the best countries in the world before the country celebrates its 50th anniversary in 2021[10]. The review did not find enough substantial evidence to conclude that the health system reform program, including the regulatory reform, had achieved its objectives and resulted in the desired improvements. Our study identified a number of areas that needed improvement[11], such as the lack of

regulatory integration[7], poor data collection and reporting[12] and the increased prevalence of lifestyle related diseases, such as diabetes and cardiovascular diseases[13] (Chapter 3).

In order to address the second research objective, we examined and reviewed the role and impact of one regulatory tool, Clinical Practice Guidelines (CPGs), in the wider Gulf region. By conducting another systematic literature review, our research study analysed the development, implementation and evaluation of Clinical Practice Guidelines over a 13-year period. We concluded[14] that, in the wider Gulf region, there had been a lack of proliferation and implementation of evidence based clinical guidelines, raising concerns about the ability of different healthcare systems to address the growing public health concerns regarding non communicable diseases[15] (Chapter 4). Our study did not find robust evidence of widespread proliferation of CPGs or evidence that the implementation of this regulatory tool had resulted in quality improvements. A small number of published research studies (8 studies, out of a total of 58) had evaluated the effectiveness of the introduction of CPG as an intervention. Out of these effectiveness studies, 5 reported positive results. However, for many of these studies CPGs formed part of a series of interventions, such as the introduction of specialized clinics and awareness raising activities, making it difficult to draw any conclusions about the role and effects of CPG as a regulatory instrument.

There are several regional and local characteristics that play an important role in this research. First, the healthcare system in the UAE, and the rest of the Gulf region, is relatively young compared to other, developed countries and regions. Up until the late 1960s and early 1970s, most of the Gulf region was relatively underdeveloped in terms of healthcare provision and infrastructure. In terms of medical education for example, the UAE only opened its first medical school in the mid 1980s[16]. It is worth bearing in mind that the Gulf society has changed dramatically over the last 40 – 50 years, with huge demographic and societal changes accompanied by strong economic growth[17].

Whereas some countries such as the United Kingdom, France, Germany and The Netherlands have had some type of healthcare regulation in place since the mid-19th century[18,19], many countries in the Gulf region established their regulatory system more recently, towards the end of the 20th century. The healthcare regulatory infrastructure in the UAE was controlled at a federal level until 2006 when, at an Emirate level, Dubai and Abu Dhabi established their own regulatory systems, resulting in a more complex healthcare infrastructure[20]. Taking this into consideration, our systematic reviews summarized the progress made in a relatively short period of time as well as identifying a number of areas for further improvement.

In addition to the challenge of building capacity within the healthcare system over a short period of time, there are indications that the region also encounters capability challenges, such

as a lack of awareness around mandatory adverse event reporting[21], a limited contribution to medical research[22] and a lack of technical efficiency of its hospitals[23]. This local context with a relatively new healthcare system with a number of capacity as well as capability gaps, creates a challenging environment for the effective provision of oversight.

Our research also looked at factors influencing compliance (self-reported and observed). In this part of the study[24], medical students were asked for their opinions and perception of healthcare regulations as well as their levels of compliance with regulatory requirements. Our findings supported the hypothesis that an individual's compliance level is shaped by their perceptions of the legitimacy, fairness and performance of the regulatory agency. At the same time, our cross-sectional study found that deterrence factors, such as the perceived likelihood of getting caught, had no effect on the reported compliance levels (Chapter 5).

Our follow up study[25] (Chapter 6) found a discrepancy between self-reported and observed performance: Nearly 70% of participants reported that they had performed the clinical task to the best of their abilities. However, from our observations, we found that the majority of the medical students (more than 75%) did not adequately perform the clinical tasks during the clinical skills simulation. We concluded that the self-assessed performance of medical students is not related to their observed compliance and therefore may be an unreliable predictor of observed compliance. Other studies found similar discrepancies between self assessed and observed performance.[26,27] One study, involving nursing staff in Kuwait, found a self-reported compliance of 90% with hand hygiene requirements and an observed compliance of 33%.[28] It is worth noting that actual, observed hand hygiene compliance scores amongst healthcare professionals are frequently below 40%[29] and our participants' ability to rate their own performance may have actually been accurate, considering that the expected observed compliance level is below 40%.

The final part of our study included a natural field experiment (Chapter 7), involving medical students who were faced with a task to demonstrate their clinical skills (hand hygiene performed before and after blood pressure measurement). Compliance with regulatory requirements was measured by observing clinical practice. Compliance with hand hygiene requirements was chosen as it can be viewed as an example of altruistic behaviour since the action does not benefit the actor directly or immediately. The evolutionary legacy hypothesis postulates that actors may display complaint (altruistic) behaviour if it is viewed as a reputation building opportunity. Our study did not find evidence that exposure to visual behavioural cues resulted in improved compliance[30] and concluded that further research needs to be conducted into the potential benefits of such methods.

8.3 Methodological considerations

To ensure scientific rigor we used several research models, in accordance with the study design outlined in Chapter 1. This section describes the most relevant aspects of the research methodologies deployed in our study and discusses the potential impact on the findings.

Design of studies evaluating the health care systems in Abu Dhabi and UAE

We reviewed the progress of the healthcare system in Abu Dhabi and the UAE between 2002 and 2016 (Chapters 2 and 3). These reviews were based on an extensive search and evaluation of the available evidence.

We faced a number of methodological challenges conducting this research. First of all, it was difficult to draw firm conclusions due to the overall lack of high-quality research evidence into the impact of health system reform in Abu Dhabi and the UAE. We conducted two studies, five years apart, in order to investigate whether improvements in the health system research had been made between our first study in 2011/2012 and the second study in 2015/2016. To improve the usefulness of our reviews we conducted a thorough analysis of 'grey' literature, including reports issued by local government agencies, international bodies, such as the World Health Organization (WHO). We also used the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidelines for the second systematic review to ensure that we conducted a thorough and comprehensive search of all available literature. A final challenge concerned the lack of uniformity when it comes to complex interventions aimed at improving healthcare quality.[31] We addressed this by including a large number of different search terms and by conducting the second review. However, the paucity and limited scope of the studies means that it is difficult to draw any major conclusions as to whether the reform programs in Abu Dhabi and the UAE have achieved the desired impact.

Design of a study to evaluate the development, implementation and impact of Clinical Practice Guidelines

A number of international studies have found a moderate, positive effect of CPGs on the quality and safety of health care independent of geographical location.[32,33] We therefore conducted another systematic review to investigate the development, implementation and evaluation of one particular healthcare regulatory instrument, Clinical Practice Guidelines (CPGs), in the wider Gulf region (Chapter 4). Many healthcare regulatory agencies have attempted to steer and direct the behaviour of healthcare professionals by developing and disseminating CPGs[34] and our research examined the availability, use and effects of these regulatory instruments in the Gulf region.

The first challenges related to the relevancy and paucity of the research: research evidence can rapidly become outdated as more and more research is published[35]. To address this, we only included recent literature (between 2000 and 2013) and confined our search to one geographical area (GCC). We also designed and followed a comprehensive search strategy, including two different screening stages, in order to ensure that all relevant studies were included in the review.

Perhaps a bigger limitation is that many systematic reviews are unable to draw clear conclusions due to the a lack of scientifically sound primary research studies.[36] For example, a Cochrane review on the effectiveness of one widely implemented regulatory method, external inspection, found only two high quality, controlled evaluations that met the researchers' review criteria.[37,38] We had a similar findings in our review: research studies lacked robust methodology. For example, we only came across one randomized control trial, the remaining studies were largely descriptive, making it harder to draw clear conclusions.

Design of a cross sectional survey to ascertain the perceptions of medical students

We designed a cross-sectional survey to elicit the views and perceptions of the medical students (Chapter 5) in order to assess the relationship between factors such as perceived legitimacy, fairness and regulatory performance and self-reported compliance. Over 100 medical students took part (response rate 56.4%) and completed the survey. Considering the 56.4% response rate, there may have been a selection bias with some students opting out. However, the participants did not differ from the total population on variables such as gender, nationality and age.

Perhaps a more important limitation is the potential social desirability bias that can occur when participants do not answer based on their own beliefs or experiences, but rather by what they think is socially appropriate or expected from them. We undertook a number of steps to remedy this. Participants were informed that their responses would be kept confidential and their participation would not affect their grades. Secondly the participants completed the survey in a neutral environment with no interaction with fellow students, researchers or university staff.

Cross-sectional survey data rarely point directly at a causal relationship, since there are often many variables of interest that obscure the relationship between the variables.[39] In our study, variables such as age, sex, frequency of contact with regulator, etc. were included to address such concerns and the findings indicated that these contextual factors had limited effect on the self-reported compliance behaviours.

The survey measured self-reported compliance and it could be argued that self-reported compliance is not necessarily linked to actual compliant behaviour.[40] We therefore conducted a separate analysis to investigate this further (Chapter 6).

Design of a natural field experiment to test the effects of a simple and subtle behavioural cue

We conducted a field experiment to find out whether surveillance cues have an impact on the altruistic behaviour among anonymous strangers. This type of research methodology has rarely (if ever) been used in the field of healthcare regulation and several researchers have recommended the use of experimental designs to investigate the impact of regulatory methods[31,38]. Influenced by the so-called effect change model[3], we tested whether the intended behaviour (hand hygiene) can be affected by different behavioural cues. Students involved in this study volunteered to participate, signed a consent form and were randomly assigned to one of four examination rooms. In addition to this, the practice slot and room was randomly assigned into one of three treatments. This experimental study design is the most scientifically rigorous available to establish a causal relationship between two variables, in this case behavioural cues and observed compliant behaviour.

One potential methodological concern was the potential changes in participant's behaviour due to their awareness of being observed (observer or Hawthorne effect). This concern was particularly relevant because the study took place in the same university where the medical students received their clinical training. Although we cannot completely rule out this potential bias, it is worth emphasizing four points. First, participants were randomly assigned to different private examination rooms located in an isolated wing of the university that students normally do not access. Participants were then asked to perform a relatively simple clinical practice task and observers were not known to the participants. In order to further minimize potential bias, the observers were trained and experienced in observing students' performance and used a standardized observation checklist. Furthermore, one of the research assistants covertly monitored the participant's behaviour by acting bored pretending to complete a Sudoku book. Finally, if participant had been concerned about their reputation, their compliance score would have been higher than observed. As noted, the actual observed compliance behaviour fell considerably short of the WHO guidelines.

The second methodological concern was the statistical significance of the sample size. Since our study was the first to explore the impact of surveillance cues on compliance behaviour in a natural field setting, we had no benchmark for the potential sizes of the different treatment groups. To remedy this, we based our statistical calculations on other numerous studies, including the WHO estimates of hand hygiene compliance (40%)[41], as well as a similar experiment[42].

Even though this study can be classified as a natural field experiment, the replicability of these findings to a real life setting might be challenging[43]. Having conducted this study in a well-controlled environment with only two "bystanders" provides the methodological assurances of the validity of our findings. However, it has been argued that the effects of a subtle behavioural cue may actually be stronger in a real life environment as people are more sensitive to social consequences of one's actions in public spaces such as bus stops and super markets[44]. Replicating this study in a real life setting certainly has merits even though our study showed no evidence behavioural cues improve regulatory compliance.

8.4 Implications for healthcare regulatory research, policy and practice

In this study we reviewed the potential impact of three regulatory tools in particular: guidelines, behavioural cues and perceptions. This section discusses the implications of this research study, in terms of further research and future policy and practice.

Implications for further research

This study contributes to the research into healthcare regulation in two important ways. First of all, there are several research implications within the geographical context and secondly the study also identified areas for improvement in the broader context of the study into healthcare regulation.

Firstly, this research study has provided new insights into the role of healthcare regulatory methods in a rapidly developing region. Further research is required to study the role and impact of regulatory methods. The unique healthcare regulatory context in the UAE provides a number of opportunities for further research. As the healthcare system in the UAE is evolving, it may be an opportune time to conduct interrupted time series or even randomized controlled trials, in order to measure the effects of various regulatory methods. For example, a recent interrupted time series analysis study in a UAE hospital[45] reviewed the impact of accreditation and found that improvement achieved from accreditation was maintained during the three year accreditation cycle. Healthcare regulatory agencies in the UAE have introduced new regulatory initiatives in recent times, such as mandatory health insurance, electronic medical records and health information exchanges[46]. As these interventions are being implemented, regulatory agencies and research institutions should conduct effectiveness studies using research methods such as randomized controlled trials, longitudinal studies and field experiments.

Secondly, a taxonomy of regulatory methods can help to focus the research activities and allow regulatory agencies to concentrate on day-to-day activities that can influence compliance behaviour. At the same time, regulatory agencies need to support further research into the relationship between the behaviour and the ultimate outcomes of concern. Whilst further research using the effect chain would help to create a better understanding of the impact of regulation, it should not become a goal in itself. Several researchers have argued that, in practice causality might be impossible to prove[47] due to the complexity of the 'phenomena' being studied and the data limitations[18].

Our study found an association between perceptions of legitimacy and fairness and reported compliance. Using experimental research designs can help researchers to conduct simple, cost effective, observational studies into compliant behaviours that investigate what part of the regulation works, for whom and in what circumstances[48]. The paucity of high-quality research evidence into the effectiveness of healthcare regulation[38] can be addressed by breaking down the regulatory processes and its methods into smaller chunks that allow a regulatory authority to examine which parts work and which do not[49].

Future research on the optimal utilization of regulatory methods should concentrate on continuing using low-cost research studies using a mixture of different methodologies, including natural field experiments and surveys, as well as population based surveys to measure the views and perceptions of the general public[50,51].

Implications for policy and practice

This research study presents a number of findings which have implications for policy and practice. First, regulatory agencies need to take into consideration how regulated organizations and their staff perceive characteristics such as fairness, performance and legitimacy when performing their regulatory functions. The future physicians who participated in our study are more likely to display compliant behaviour when they perceive the regulatory agency as being fair, competent and legitimate. These findings provide further evidence in support of the responsive regulation paradigm as postulated by Ayres and Braithwaite[52]. The responsive regulation theory argues that better regulatory outcomes can be achieved if the regulatory agency is responsive to the needs of the regulated persons and organizations. Considering the costs of regulation and impact of non-compliance, combined with the lack of evidence for a deterrence approach, policy makers and regulatory agencies should focus more on creating a regulatory environment that reflects the principles of responsive regulation.

A taxonomy of regulatory methods will help regulatory agencies and researchers to gain more granular insights into the role and impact of a variety of methods. Regulatory agencies need to concentrate their research activities on the intended overall impact of the regulatory

activities, broken down into smaller steps or processes[47]. Each process within the effect chain should have its own, measurable goals and regulatory methods. This way the regulatory authority can direct its energy and efforts towards methods that are within their locus of control, helping the regulatory authority to show its added value[53]. For example, in our study, we were able to show that simple behavioural cues did not have a significant impact on compliant behaviours.

Regulatory agencies need to be flexible and explore, adapt, design and implement the most appropriate regulatory methods at their disposal to target relevant compliant behaviours that will ultimately lead to better outcomes. Even though many regulatory agencies have a wide arsenal of regulatory methods available to them, there is limited evidence how, when and if these methods achieve the desired effects in a healthcare setting. A taxonomy of relevant methods may help in identifying the most suitable method in order to achieve the regulatory objectives. In his seminal book about regulation, The Regulatory Craft, Malcolm Sparrow articulated this regulatory strategy as follows: "*Pick an important problem. Fix it. Tell everyone*"[47].

Implications for local policy

Despite its many achievements, the UAE health system remains fragmented and in need of further reform[54]. The UAE Government has acknowledged this and set out a clear vision for the future with the ultimate goal to create a world-class health system[55].

To address the fragmentation of the UAE health system, the UAE should consider establishing a single, independent statutory healthcare regulatory authority dedicated to overseeing the performance of the overall health system, building on the best international practice available. Our research evidence points towards a need to collect more reliable data on healthcare outcomes and benchmark the performance globally[56]. Compared to other health systems with a more mature health care system, the UAE appears to be on the right track with its focus on market reforms through privatization, rates setting and public-private partnerships[2]. In the first instance, the UAE healthcare regulatory agencies could review their existing regulatory methods at their disposal and formulate new ways of implementation. For example, the healthcare professional licensing system in the UAE is now harmonised across the entire country[57] and this harmonised system could provide a useful platform for further cooperation between the regulatory authorities.

As a rapidly growing and developing country, the UAE could build on the combined experience and knowledge from regulatory agencies from other countries. The OECD has developed a monitoring framework and effect chain to measure regulatory progress[3] and at a national level the UAE could utilize this framework as well as subsequent versions and

iterations[58,59] to conduct periodic reviews. In addition, the UAE is in an ideal position to learn from and put in practice the most relevant, up to date evidence when it comes to effective regulatory methods.

8.5 Conclusion

This research looked at how healthcare regulators can best utilize regulatory methods in order to improve compliance. To answer the research question, we identified a suitable taxonomy and a broader effect chain framework that we could use. Predicting whether and how healthcare providers and professionals will respond to different regulatory methods and comply with regulatory requirements is a fundamental prerequisite to improve regulatory compliance. We used the taxonomy proposed by Freiberg[4] as a tool to identify and select regulatory methods.

In our study we reviewed the potential use and impact of three such regulatory methods: Legal (Clinical Practice Guidelines), Structural (behavioural nudges) and Informational (perceptions).

Our systematic review of CPGs in Gulf countries over a 13-year period found a small number of studies that had evaluated an impact on outcomes. A number of these studies had found positive effects, but it was unclear how the actual CPG compliance had contributed to this because CPG compliance formed part of a larger intervention, often including activities such as awareness raising, clinic redesign and training. Our overall conclusion is that CPGs have potential as a regulatory tool and regulatory authorities should consider using CPGs as tools to improve patient outcomes.

Changing the choice architecture by introducing behavioural nudges did not lead to a significant change in compliant behaviour. In our study we conducted a field experiment and found no difference in compliance behaviours between participants exposed to different behavioural cues. However, this regulatory method is relatively inexpensive to implement and in a different environment with an extended exposure it may help to improve compliance.

Our survey measured the perceived fairness, legitimacy, risk of getting caught or punished and performance of the regulatory agency and its relationship with self-reported compliance. We concluded that regulation based on trust and fairness is more likely to be effective than regulation with a focus on deterrence. Our research findings may help regulatory agencies to concentrate their efforts on building trust by ensuring that its regulatory processes are fair and transparent. It should be noted that in a follow up study we could not find a relationship

between the self-reported compliance and observed compliance. However, recent evidence also suggests that inspectors judgements and observations are not as reliable as often assumed[60] . Regulatory agencies need to realize that a complex and multidimensional reality cannot be measured by one tool alone and it is often a multitude or hybrid of tools that will give an accurate reflection of compliance.[61]

As noted in the introductory Chapter, the so-called effect chain assumes that an increase in compliance leads to improvements in the healthcare performance.[62] Our research looked at the first part of the effect chain: the relationship between particular regulatory methods and compliant behaviour. This research found limited evidence of this relationship, but it can be used as an impetus for regulators to introduce new and innovative regulatory methods that can improve compliance and deliver positive results.

In response to the paucity of evidence regarding the effectiveness of healthcare regulation, combined with the growing concerns over quality and safety of care (i.e. do nothing is not an option), regulatory agencies have a bigger chance to make an impact if they regularly reviewed the regulatory methods at their disposal and design a regulatory approach accordingly. By starting to acknowledge and address the limitations of their endeavours, regulatory agencies can establish a productive effect chain.

Finally, it may also guide and inspire future researchers, practitioners and policy makers to develop, test and implement new and innovative regulatory methods that will improve compliance and support the overall achievement of regulatory objectives. Well executed research projects, no matter how small, will help to build legitimacy and ultimately trust in the healthcare system. In turn, this legitimacy and trust will have an impact on compliance levels and ultimately lead to the achievement of regulatory goals.

8.6 References

1. Carter AO, Elzubeir M, Abdulrazzaq YM, Revel AD, Townsend A. Health and lifestyle needs assessment of medical students in the United Arab Emirates. *Med Teach*. 2003;25(5):492-496. doi:10.1080/01421590310001605633
2. Blair I, Sharif A. Health and health systems performance in the United Arab Emirates. *World Hosp Health Serv*. 2013;49(4):12-17. http://www.ncbi.nlm.nih.gov/pubmed/24683809.
3. Coglianese C. *Measuring Regulatory Performance: Evaluating the Impact of Regulation and Regulatory Policy*. Paris; 2012. http://www.oecd.org/gov/regulatory-policy/1_coglianese web.pdf.
4. Freiberg A. *Re-Stocking the Regulatory Tool-Kit*. Dublin; 2010. http://regulation.upf.edu/dublin-10-papers/1I1.pdf.
5. Koornneef EJ, Robben PBM, Seiari Al MB, Siksek Al Z. Health system reform in the Emirate of Abu Dhabi, United Arab Emirates. *Health Policy*. 2012;108(2-3):115-121. doi:10.1016/j.healthpol.2012.08.026
6. Paulo MS, Loney T, Lapão LV. The primary health care in the emirate of Abu Dhabi: are they aligned with the chronic care model elements? *BMC Health Serv Res*. 2017;17(1):725. doi:10.1186/s12913-017-2691-4
7. The Economist Intelligence Unit. *Investing in Quality Healthcare in the UAE*. Dubai, UAE; 2015. http://www.wahacapital.ae/docs/default-source/reports/Publications/investing-in-quality-web.pdf?sfvrsn=2.
8. Hamidi S, Akinci F. Examining the health care payment reforms in Abu Dhabi. *Int J Health Plann Manage*. 2015;30(2):E69-82. doi:10.1002/hpm.2276
9. Brouwers MC, Kho ME, Browman GP, et al. AGREE II: Advancing guideline development, reporting and evaluation in health care. *J Clin Epidemiol*. 2010;63(12):1308-1311. doi:10.1016/j.jclinepi.2010.07.001
10. UAE Prime Minister's Office. *UAE Vision 2021*. Abu Dhabi; 2010. http://www.vision2021.ae/en/our-vision.
11. Koornneef E, Robben P, Blair I. Progress and outcomes of health systems reform in the United Arab Emirates: A systematic review. *BMC Health Serv Res*. 2017;17(1). doi:10.1186/s12913-017-2597-1
12. Blair I, Sharif AA. Population structure and the burden of disease in the United Arab Emirates. *J Epidemiol Glob Health*. 2012;2(2):61-71. doi:10.1016/j.jegh.2012.04.002
13. Loney T, Aw T, Handysides DG, et al. An analysis of the health status of the United Arab Emirates: the 'Big 4' public health issues. *Glob Health Action*. 2013;6(1):20100. doi:10.3402/gha.v6i0.20100
14. Koornneef E, Robben P, Hajat C, Ali A. The development, implementation and evaluation of clinical practice guidelines in Gulf Cooperation Council (GCC) countries: a systematic review of literature. *J Eval Clin Pract*. 2015;21(6):1006-1013. doi:10.1111/jep.12337

15. Rahim HFA, Sibai A, Khader Y, et al. Non-communicable diseases in the Arab world. *Lancet*. 2014;383(9914):356-367. doi:10.1016/S0140-6736(13)62383-1

16. Bin Abdulrahman KA. The current status of medical education in the Gulf Cooperation Council countries. *Ann Saudi Med*. 2008;28(4):83-88. http://www.annsaudimed.net/index.php/vol28/vol28iss2/173.html?view=abstract.

17. The Economist Intelligence Unit. *The GCC in 2020 : Resources for the Future*.; 2010. http://graphics.eiu.com/upload/eb/GCC_in_2020_Resources_WEB.pdf.

18. Blanc F. From Chasing Violations to Managing Risks (Doctoral dissertation). 2016. https://openaccess.leidenuniv.nl/bitstream/handle/1887/44710/20161025_Florentin_Blanc_From_Chasing_Violations_to_Managing_Risks_PhD_for_print.pdf?sequence=1.

19. Robben PBM, Bal R, Grol RPTM. *Government Supervision by the Netherlands Health Care Inspectorate, A Sectoral Outline*. The Hague; 2012. http://epsonet.eu.

20. US UAE Business Council. *The U.A.E. Healthcare Sector*.; 2013. http://usuaebusiness.org/.

21. Said ASA, Hussain N. Adverse Drug Reaction Reporting Practices Among United Arab Emirates Pharmacists and Prescribers. *Hosp Pharm*. 2017;52(5):361-366. doi:10.1177/0018578717715364

22. Meo SA, Hassan A, Aqil M, Usmani AM. Medical education research in GCC countries. *BMC Med Educ*. 2015;15(1):8. doi:10.1186/s12909-015-0293-6

23. Mahate A, Hamidi S, Akinci F. Measuring the Effect of Size on Technical Efficiency of the United Arab Emirates Hospitals. *Glob J Health Sci*. 2016;9(3):116. doi:10.5539/gjhs.v9n3p116

24. Koornneef EJ, Robben PBM, Oude Wesselink S. A cross-sectional study into medical students' perceptions of healthcare regulation and self-reported compliance: a study conducted in the City of Al Ain, United Arab Emirates, 2016. *BMC Med Educ*. 2018;18(1):305. doi:10.1186/s12909-018-1393-x

25. Koornneef E, Loney T, AlSuwaidi A, Silva Paulo M. Does self-perceived performance correlate with observed performance in an objective structured clinical examination? An exploratory study amongst medical students in the United Arab Emirates. *Perspect Med Educ*. 2018.

26. Davis D, Mazmanian PE, Fordis M, Van Harrison R, Thorpe KE, Perrier L. Accuracy of Physician Self-assessment Compared With Observed Measures of Competence. *JAMA*. 2006;296(9):1094. doi:10.1001/jama.296.9.1094

27. Jenner EA, Fletcher B (C., Watson P, Jones FA, Miller L, Scott GM. Discrepancy between self-reported and observed hand hygiene behaviour in healthcare professionals. *J Hosp Infect*. 2006;63(4):418-422. doi:10.1016/j.jhin.2006.03.012

28. Al-Wazzan B, Salmeen Y, Al-Amiri E, Abul A, Bouhaimed M, Al-Taiar A. Hand Hygiene Practices among Nursing Staff in Public Secondary Care Hospitals in Kuwait: Self-Report and Direct Observation. *Med Princ Pract*. 2011;20(4):326-331. doi:10.1159/000324545

29. Erasmus V, Daha TJ, Brug H, et al. Systematic review of studies on compliance with hand hygiene guidelines in hospital care. *Infect Control Hosp Epidemiol*. 2010;31(3):283-294. doi:10.1086/650451

30. Koornneef EJ, Dariel A, Elbarazi I, Alsuwaidi AR, Robben PBM, Nikiforakis N. Surveillance cues do not enhance altruistic behaviour among anonymous strangers in the field. Brañas-Garza P, ed. *PLoS One*. 2018;13(8):e0197959. doi:10.1371/journal.pone.0197959

31. Kilsdonk M, Siesling S, Otter R, Harten W van. Evaluating the impact of accreditation and external peer review. *Int J Health Care Qual Assur*. 2015;28(8):757-777. doi:10.1108/IJHC-QA-05-2014-0055

32. Grimshaw JM, Russell IT. Achieving health gain through clinical guidelines II: Ensuring guidelines change medical practice. *Qual Saf Heal Care*. 1994;3(1):45-52. doi:10.1136/qshc.3.1.45

33. Lugtenberg M, Zegers-van Schaick JM, Westert GP, Burgers JS. Why don't physicians adhere to guideline recommendations in practice? An analysis of barriers among Dutch general practitioners. *Implement Sci*. 2009;4(1):54. doi:10.1186/1748-5908-4-54

34. Healy J. *Improving Health Care Safety and Quality: Reluctant Regulators*. Ashgate; 2011.

35. Brubakk K, Vist GE, Bukholm G, Barach P, Tjomsland O. A systematic review of hospital accreditation: the challenges of measuring complex intervention effects. *BMC Health Serv Res*. 2015;15:280. doi:10.1186/s12913-015-0933-x

36. Petticrew M. Why certain systematic reviews reach uncertain conclusions. *BMJ*. 2003;326(7392):756-758. doi:10.1136/bmj.326.7392.756

37. Flodgren G, Pomey M-P, Taber SA, Eccles MP. Effectiveness of external inspection of compliance with standards in improving healthcare organisation behaviour, healthcare professional behaviour or patient outcomes. In: Eccles MP, ed. *Cochrane Database of Systematic Reviews*. Chichester, UK: John Wiley & Sons, Ltd; 2011:CD008992. doi:10.1002/14651858.CD008992.pub2

38. Flodgren G, Gonçalves-Bradley DC, Pomey M-P. External inspection of compliance with standards for improved healthcare outcomes. *Cochrane Database Syst Rev*. 2016;2016(12). doi:10.1002/14651858.CD008992.pub3

39. Murphy K, Tyler TR, Curtis A. Nurturing regulatory compliance: Is procedural justice effective when people question the legitimacy of the law? *Regul Gov*. 2009;3(1):1-26. doi:10.1111/j.1748-5991.2009.01043.x

40. Tyler TR. *Why People Obey the Law*. Princeton University Press; 2006.

41. Boyce JM, Pittet D. *Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Society for Healthcare Epidemiology of America/Association for Prof*. Vol 51.; 2002. doi:10.1086/503164

42. Bateson M, Robinson R, Abayomi-Cole T, Greenlees J, O'Connor A, Nettle D. Watching eyes on potential litter can reduce littering: evidence from two field experiments. *PeerJ*. 2015;3:e1443. doi:10.7717/peerj.1443

43. Francey D, Bergmüller R. Images of Eyes Enhance Investments in a Real-Life Public Good. Szolnoki A, ed. *PLoS One*. 2012;7(5):e37397. doi:10.1371/journal.pone.0037397

44. Powell KL, Roberts G, Nettle D. Eye Images Increase Charitable Donations: Evidence From an Opportunistic Field Experiment in a Supermarket. *Ethology*. 2012;118(11):1096-1101. doi:10.1111/eth.12011

45. Devkaran S, O'Farrell PN. The impact of hospital accreditation on quality measures: an interrupted time series analysis. *BMC Health Serv Res*. 2015;15(1):137. doi:10.1186/s12913-015-0784-5

46. US-UAE Business Council. *The U.A.E. Healthcare Sector. An Update: January 2018*. Abu Dhabi; 2018. http://www.usuaebusiness.org/wp-content/uploads/2018/01/Healthcare-Report-Final-January-2018-Update-1.pdf.

47. Sparrow M. *The Regulatory Craft: Controlling Risks, Solving Problems, and Managing Compliance*. Washington DC: Brookings Institution Press; 2000.

48. Pawson R, Greenhalgh T, Harvey G, Walshe K. Realist review - a new method of systematic review designed for complex policy interventions. *J Health Serv Res Policy*. 2005;10(1_suppl):21-34. doi:10.1258/1355819054308530

49. Kringos DS, Sunol R, Wagner C, et al. The influence of context on the effectiveness of hospital quality improvement strategies: a review of systematic reviews. *BMC Health Serv Res*. 2015;15(1):277. doi:10.1186/s12913-015-0906-0

50. Carter D, Brown J, Saunders C. *Understanding Public Expectations of Healthcare Quality and Safety Regulation in Australia*. Sydney; 2018. doi:10.31228/osf.io/c48by

51. Bouwman R, Bomhoff M, de Jong JD, Robben P, Friele R. The public's voice about healthcare quality regulation policies. A population-based survey. *BMC Health Serv Res*. 2015;15(1):325. doi:10.1186/s12913-015-0992-z

52. Ayers, I., Braithwaite J. *Responsive Regulation: Transcending the Deregulation Debate*. Oxford University Press; 1994. doi:0195093763

53. Leistikow I. *The Proof of the Pudding: The Value of Governmental Regulation of Healthcare Quality and Safety*. Rotterdam, The Netherlands; 2018. https://www.eur.nl/file-download/download/public/141578.

54. Sharif AAM. Mapping the UAE Health System: Challenges and Recommendations (Doctoral Dissertation). 2016. https://scholarworks.uaeu.ac.ae/all_theses/628.

55. Alpen Capital. *GCC Healthcare Industry Report*. Dubai, UAE; 2016. http://www.alpencapital.com/industry-reports.html.

56. Mattke S, Epstein AM, Leatherman S. The OECD Health Care Quality Indicators Project: history and background. *Int J Qual Health Care*. 2006;18 Suppl 1(September):1-4. doi:10.1093/intqhc/mzl019

57. Aqtash S, Robb WF, Hunter LH, Almuhtasib M, Hamad A, Brownie SM. Self-Assessed Competence of Experienced Expatriate Nurses in a Rural and Remote Setting. *SAGE Open Nurs*. 2017;3:237796081770238. doi:10.1177/2377960817702382

58. Lind E, Arndt C. *Perceived Fairness and Regulatory Policy: A Behavioural Science Perspective on Government-Citizen Interactions*. Paris; 2016. doi:10.1787/24140996

59. Lunn P. *Regulatory Policy and Behavioural Economics*. Paris: OECD Publishing; 2014. doi: 10.1787/9789264207851-en

60. Tuijn SM, Robben PBM, Janssens FJG, van den Bergh H. Evaluating instruments for regulation of health care in the Netherlands. *J Eval Clin Pract*. 2011;17(3):411-419. doi:10.1111/j.1365-2753.2010.01431.x

61. Furnival J, Walshe K, Boaden R. Emerging hybridity: comparing UK healthcare regulatory arrangements. *J Health Organ Manag*. 2017;31(4):517-528. doi:10.1108/JHOM-06-2016-0109

62. Oude Wesselink S. Towards evidence-based government supervision in healthcare. 2015. http://www.oudewesselink.net/proefschrift/.