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The dual vulnerability of transnational, science-based standards in the national legal order*

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ABSTRACT

This paper highlights the scientific and political vulnerability of transnational science-based standards. This paper focuses on radiation standards formulated by the decentralised web of expert committees and inter-governmental forums. Transnational science-based standards are beset with *scientific* fragility, precisely because they provide certain regulatory stability in the scientifically uncertain areas. This scientific fragility is accompanied by *political* vulnerability. Transnational science-based standards are often formulated without the involvement of those private entities and individuals on whom the standards have visible consequences. This paper exposes the domestic neglect of dual vulnerability by analysing the Japanese stories after Hiroshima–Nagasaki (1945) and Fukushima (2011). While this paper discusses a specific scenario, the issue of dual vulnerability would likely arise in many other science-based standards which are formulated transnationally and absorbed into the domestic legal order on the basis that they are scientifically authoritative with little need for political input.

KEYWORDS Transnational standards; science-based regulation; radiation; domestic law; deference

1. Introduction

Quantitative scientific evidence can be an essential basis for policies and laws aimed at enhancing the safety of our daily lives. Numerical evidence informs national regulators when they promulgate the necessary limits and procedures for the safety of, for instance, chemical products, foods and industrial products. A wide range of science-based standards (including scientific models) on which national regulation is based are very often the products of interactions between researchers, industry representatives, government

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officials and officials of international organisations. These researchers and officials gather at international committees of experts, international organisations and inter-governmental forums, and not only collect and tailor scientific findings, but also discuss their wider social and political implications. These bodies—or 'transnational regulatory scientific institutions', as Oren Perez nicely phrases it in his article in the European Journal of International law[1]—provide a unique venue for interaction among scientists, industry and governmental agencies around the world.

The decentralised web of the scientific and regulatory institutions produces a wide range of what this paper calls *transnational science-based standards*. While the terms 'transnational' and 'international' can be used interchangeably,[2] I prefer to use the term 'transnational' over the term 'international' in this paper by taking into account the presence of non-governmental actors, such as scientific experts and industry representatives, who play significant roles in setting the cross-border standards based on scientific data. Transnational science-based standards have actual impact on our lives when they are voluntarily utilised at the domestic level. In order to reduce regulatory fragmentation across states, international expert committees and organisations actively promote, if not oblige, the permeation of their science-based models, guidelines and recommendations into domestic spheres.[3] In response, national legislatures, executives and judges may actively absorb internationally promoted standards into the domestic statutes, administrative instruments and judicial decisions.

Among a range of transnational science-based standards, this paper focuses on those about radiation safety,[4] which protect nuclear-related

[1] Oren Perez, 'The Hybrid Legal-Scientific Dynamic of Transnational Scientific Institutions' (2015) 26 *European Journal of International Law* 391. All websites accessed 1 June 2016.

[2] In general, there is no clear-cut distinction between the terms 'international' and 'transnational'. Both terms can be used for laws and norms applicable across borders. Yet the term 'transnational' is often *preferred* when cross-border laws and norms are made by actors *other than* states and inter-governmental organisations. The term 'transnational' has also been used in order to collectively capture 'all law which regulates actions or events that transcend national frontiers', with respect to which the distinction between public international law, private international law and other cross-border rules is blurred. See Philip C. Jessup, *Transnational Law* (Yale University Press, 1956) 2, 15, 106–111.

[3] Domestic acceptance can be incrementally promoted through a range of different methods. One of such means is to conduct a follow-up assessment. For instance, regarding the example of the ICRP's recommendations discussed in this paper, the OECD's Nuclear Energy Agency (NEA) has prepared the reports with regard to the implementation processes of the ICRP's recommendations. See Jack Valentin, *Report on the Implementation of ICRP Recommendations by NEA Member States* (October 2006), 3rd NEA/ICRP Forum, Prague, online: <www.oecdnea.org/rp/prague/Implementation_of_ICRP_recommendations.pdf>; OECD Nuclear Energy Agency, Committee on Radiation Protection and Public Health, *Discussion on Implementation of International Commission on Radiological Protection Recommendations Concerning Reference Levels and Optimisation* (27 June 2013), online: <www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=NEA/CRPPH/R%282013%292&docLanguage=En>.

[4] For the purpose of this paper, radiation 'standards' are used broadly to include not only the standards of dose limits (which are of particular relevance to Section 4, the case of Fukushima), but the system to calculate radiation dose and the widely accepted epidemiological findings on the effect of radiation on human health (which are of particular relevance to Section 3, the case of Hiroshima–Nagasaki).

workers and the general public from exposure to ionising radiation. Scientific consensus and associated policy recommendations are incrementally formulated by the decentralised web of research institutions, transnational expert committees, international organisations and inter-governmental forums.[5] One of the most influential standard-setting bodies in this regard is the International Commission on Radiological Protection (ICRP), a formally non-governmental and non-profit expert committee, as will be explained in Section 2. The ICRP's science-based recommendations have been widely incorporated into the domestic law of the US,[6] and many other countries.[7] The domestic permeation of transnational radiation standards has the virtue of achieving regulatory unity across states without the rigidity of concluding formal treaties. Nevertheless, a critical concern has been raised as to whether the domestic adoption of transnational science-based standards has underestimated or even neglected both the *scientific* and *political* fragility in such standards which are adopted at the national level.[8]

This paper attempts to highlight the scientific and political vulnerability of transnational science-based standards, and it does so by analysing the domestic acceptance and resistance of transnational radiation standards in the specific context of Japan, which has encountered two nuclear disasters: (1) the Hiroshima–Nagasaki bombs of 1945, for which transnationally approved *dosimetry systems* and *epidemiological findings* were adopted in order to determine the entitlement of medical allowances at the national level (Section 3) and; (2) the Fukushima Daiichi nuclear accident of 2011, for which the transnationally recommended *dose limits* were invoked in order to raise the legally permissible exposure limits for the general public, including children (Section 4). In both cases, a series of claims have been brought before domestic courts against the government's decisions which accepted transnational radiation standards and stressed the scientific integrity of transnational standard-setting bodies. These Japanese cases, albeit in different contexts, show that the government neglected and failed to remedy scientific and political limits attached to transnational science-based standards (Sections 5 and 6—Conclusion).

This paper is an extension of two sets of international legal studies. On the one hand, it is part of the engagement of international legal scholarship to

[5] See Section 2.2. Lindell also provides a good overview as to how various institutions interactively develop radiological standards. See B Lindell, 'A History of Radiation Protection' (1996) 68 *Radiation Protection Dosimetry* 83.

[6] See (n 28).

[7] See (n 105).

[8] This point is further elaborated on in Oren Perez' aforementioned paper: Perez eloquently observes that transnational regulatory scientific institutions provide a hierarchical process and the institutional ordering with regard to the determination of issues whose scientific uncertainty tends to create a regulatory lacuna. Perez suggests that such institutions are in a unique position to retain both epistemic and legal authority, yet this duality also renders unstable the legitimacy of transnational regulatory scientific institutions. See Perez (n 1) 391–416.

analyse the interactions between the national and international legal orders. The studies on the interactions between the two legal orders traditionally focus on the national reception of *formally binding* treaties and customary international law.[9] There is also a growing body of literature on the *international* reception of national law.[10] Significantly underexplored still is the *domestic* reception of *non-binding standards* formulated by transnational bodies, including science-based standards. This paper precisely analyses this neglected interaction. On the other hand, this paper also contributes to studies on international legal regulation and scientific uncertainty,[11] which are, in turn, part of wider 'law and science' literature.[12] Scientific uncertainty persists in international regulation concerning for instance, beef hormones,[13] genetically modified organisms,[14] nanotechnologies,[15] and food safety.[16] Despite the growth of literature in this field, existing studies have yet to fully analyse how transnational scientific and regulatory bodies produce standards in an interactive manner, and how their science-based standards both strengthen and undermine the ability of domestic actors to invoke them at

[9] There is certainly voluminous literature. See David Sloss, 'Domestic Application of Treaties' in DB Hollis (ed), *The Oxford Guide to Treaties* (Oxford University Press, 2012) 367–395; David Sloss, 'Treaty Enforcement in Domestic Courts: A Comparative Analysis' in D Sloss (ed), *The Role of Domestic Courts in Treaty Enforcement: A Comparative Study* (Cambridge University Press, 2009) 1–60; Dinah Shelton (ed), *International Law and Domestic Legal Systems: Incorporation, Transformation, and Persuasion* (Oxford University Press, 2011).

[10] See Yuval Shany, *Regulating Jurisdictional Relations Between National and International Courts* (Oxford University Press, 2007); Anthea Roberts, 'Comparative International Law? The Role of National Courts in Creating and Enforcing International Law' (2011) 60 *International & Comparative Law Quarterly* 57; Machiko Kanetake and André Nollkaemper (eds), *The Rule of Law at the National and International Levels: Contestations and Deference* (Hart Publishing, 2016).

[11] See Robert Howse, 'Democracy, Science, and Free Trade: Risk Regulation on Trial at the World Trade Organization' (2000) 98 *Michigan Law Review* 2329; David Winickoff, Sheila Jasanoff, Lawrence Busch, Robin Grove-White and Brian Wynne, 'Adjudicating the GM Food Wars: Science, Risk, and Democracy in World Trade Law' (2005) 30 *Yale Journal of International Law* 81; Jacqueline Peel, *Science and Risk Regulation in International Law* (Cambridge University Press, 2010); Alexia Herwig, 'Whither Science in WTO Dispute Settlement?' (2008) 21 *Leiden Journal of International Law* 823.

[12] See the contributions in Helen Reece (ed), *Law and Science* (Oxford University Press, 1998). One of the key issues is how legal rules and practices establish certainty despite scientific uncertainty in risk assessment. On the social implication of scientific risk assessment and the risk of science, see Niklas Luhmann, *Risk: A Sociological Theory* (Walter de Gruyter, 1993) 203–218.

[13] See Vern R Walker, 'Keeping the WTO from Becoming the World Trans-Science Organization: Scientific Uncertainty, Science Policy, and Factfinding in the Growth Hormones Dispute' (1998) 31 *Cornell International Law Journal* 251; Jacqueline Peel, 'Of Apples and Oranges (and Hormones in Beef): Science and the Standard of Review in WTO Disputes Under the SPS Agreement' (2012) 61 *International & Comparative Law Quarterly* 427.

[14] See Dario Bevilacqua, 'The International Regulation of Genetically Modified Organisms: Uncertainty, Fragmentation, and Precaution' (2007) 16 *European Energy and Environmental Law Review* 314.

[15] See Kenneth W Abbott, Douglas J Sylvester and Gary E Marchant, 'Transnational Regulation of Nanotechnology: Reality or Romanticism?' in GA Hodge, DM Bowman and AD Maynard (eds), *International Handbook on Regulating Nanotechnologies* (Edward Elgar Publishing, 2010) 525–544; Makane Moïse Mbengue and Margaux Charles, 'International Organizations and Nanotechnologies: The Challenge of Coordination' (2013) 22 *Review of European, Comparative & International Environmental Law* 174.

[16] See Naomi Rees and David Watson (eds), *International Standards for Food Safety* (Aspen Publishers, 2000); Sanderijn Duquet and Dylan Geraets, 'Food Safety Standards and Informal International Lawmaking' in Ayelet Berman, Sanderijn Duquet, Joost Pauwelyn, Ramses A Wessel and Jan Wouters (eds), *Informal International Lawmaking: Case Studies* (Torkel Opsahl Academic EPublisher, 2012) 395–433.

the national legal order. This paper is an attempt to fill this gap in existing studies.

2. The web of transnational bodies on radiation standards

Radiation standards, which concern two Japanese cases I will analyse in Sections 3 and 4 below, are developed by the decentralised web of research institutions, international expert committees, international organisations and inter-governmental forums. Among such institutions, particularly influential are a US–Japan government-affiliated scientific institute (Section 2.1) and the aforementioned ICRP as an international expert committee (Section 2.2). The former institute provides major scientific findings, on the basis of which the ICRP issues science-based recommendations that provide a foundation for the reports of international organisations. Understanding the standard-setting role of these bodies is essential for the analysis presented in subsequent sections of this paper.

2.1. US–Japan research institutes

The formulation of radiation safety standards foremost requires the reliable data concerning the effect of ionising radiation on our bodies. One of the most comprehensive epidemiological studies on such effect has been conducted by an institution called the Atomic Bomb Casualty Commission (ABCC)[17] and its successor, Radiation Effects Research Foundation (RERF).[18] The ABCC was created shortly after the Second World War primarily to study the effects of radiation from the Hiroshima and Nagasaki atomic bombs. While the ABCC and RERF are established and have been funded by the US and Japanese governments,[19] these entities are not formally governmental bodies, and the entities' research operations have been guided by their own decision-making boards composed of radiological scientists.[20]

[17] The general description of the ABCC is available at the website of the National Academy of Sciences (NAS), *Organized Collections: Atomic Bomb Casualty Commission, 1945–82* (2016), online: <www.nasonline.org/about-nas/history/archives/collections/abcc-1945-1982.html>.

[18] The general description of the RERF is available at its website, Radiation Effects Research Foundation, *About RERF: Objective and History* (2016), online: <http://www.rerf.jp/intro/establish/index_e.html>.

[19] The ABCC was founded according to President Truman's directive in November 1946, and was overseen by the Atomic Energy Commission and the National Research Council of the National Academy of Sciences. The ABCC worked in close partnership with the Japan National Institute of Health (JNIH) established in 1947 as a governmentally associated research institute (and was renamed subsequently the National Institute of Infectious Diseases). The ABCC was replaced in 1975 by the RERF as a joint establishment of the US and Japanese governments. For the history of ABCC, see Frank W Putnam, 'The Atomic Bomb Casualty Commission in Retrospect' (1998) 95 *Proceedings of the National Academy of Sciences of the United States of America* 5426.

[20] 'The RERF was managed by a binational Board of Directors, and its scientific research activities were guided by the annual recommendations of a binational Scientific Council. Funds for RERF's operation continue to be provided by both governments … '. See RERF (n 18). In 2012, the RERF became a

The ABCC commenced a major genetic study in 1949[21] and initiated the leukaemia survey in January 1950. The ABCC also launched in 1950 the subject groups for the Life-Span Study which investigates the life-long health effects of radiation involving about 120,000 subjects.[22] These historically exceptional studies provide the major epidemiological findings regarding the effects of radiation to date.

2.2. Transnational expert committee

The RERF's epidemiological findings are collected by the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), which is an inter-governmental body created by the UN General Assembly to gather and evaluate scientific findings on the effects of exposure to ionising radiation.[23] The RERF's data, through the UNSCEAR, then provide the pieces of information to transnational standard-setting bodies, including the ICRP. The ICRP is a non-profit international expert committee registered as an independent charity in the UK. It is funded by four groups of entities: national organs and government-affiliated national bodies (such as the US Department of Energy and the US Nuclear Regulatory Commission), international organisations and inter-governmental forums (such as the International Atomic Energy Agency (IAEA), the EU and the Organisation for Economic Co-operation and Development), academic societies on radiation protection (such as the International Radiation Protection Association) and industry groups.[24]

A committee which is now known as the ICRP was established at the second International Congress of Radiology (ICR) in 1928 under the name of the International X-ray and Radium Protection Committee composed of several radiological experts.[25] After the Second World War, the ICRP incrementally established its international presence and

Public Interest Incorporated Foundation in Japan; the bi-national Board of Councillors serves as a decision-making entity, and its scientific activities are guided by the Scientific Advisory Committee.

[21] It took a few years before the ABCC commenced the systematic study, as the ABCC had encountered budgetary problems and difficulties in securing cooperation from survivors. See Putnam (n 19) 5429.

[22] Identified through the national census in 1950, approximately 120,000 subjects (including 94,000 atomic-bomb survivors and 27,000 unexposed individuals) were selected from residents of Hiroshima and Nagasaki, and the individuals' conditions have been followed since that time. See RERF, *Life Span Study* (2007), online: <www.rerf.jp/glossary_e/lss.htm>.

[23] UNGA Res 913 (X) (3 December 1955).

[24] See ICRP, *2013 Annual Report* (14 July 2014, revised 2 September 2014), 33–4, online: <www.icrp.org/docs/ICRP%20Annual%20Report%202013.pdf>; ICRP, *2012 Annual Report* (29 July 2013), 42–3, online: <www.icrp.org/docs/ICRP%20Annual%20Report%202012.pdf>.

[25] RH Clarke and J Valentin, 'The History of ICRP and the Evolution of its Policies' (2009) 39 *Annals of the ICRP* 75, 78–80. The body changed its name as the ICRP in 1950. For the history of the ICRP, see also Lauriston S Taylor, 'History of the International Commission on Radiological Protection (ICRP)' (2002) 82 *Health Physics* 789. The following presentation slides also provide a useful overview: Claire Cousins, ICRP Chair, *ICRP Past, Present and Future* (22 October 2013), ICRP Symposium, Abu Dhabi, online: <http://www.icrp.org/docs/Claire%20Cousins%20ICRP%20Past%20Present%20and%20Future.pdf>.

became affiliated with the World Health Organization (WHO) and the IAEA.[26]

The ICRP issues recommendations to regulatory and advisory agencies at the international, regional and national levels on the fundamental principles on which appropriate radiological protection can be based.[27] As will be illustrated by the Japanese experience in Sections 3 and 4, the ICRP's recommendations (as well as models and data employed for them) are widely used and incorporated in domestic law.[28]

The ICRP's first series of recommendations in 1928–50 primarily focused on occupational exposures, and provided the thresholds below which there would be no 'deterministic' effects on human health.[29] Deterministic effects mean that a person would not suffer from a particular illness unless the person is exposed to a certain level of radiation. The ICRP subsequently became engaged in the risk-benefit assessment beyond occupational contexts—this is particularly important for the Fukushima case (Section 4). The extension of the ICRP's work was motivated both by scientific and political factors; it was first due to the new scientific findings that the effects of radiation can be stochastic, or non-deterministic, with regard to the induction of cancer and some other illnesses.[30] As a result of the understanding that the low-level exposure—which was previously considered risk-free—actually entailed health risks, the ICRP was placed in the position of assessing how much risk is acceptable. The ICRP was also pushed to get involved in non-occupational standard setting as a result of political controversies. The public became much more aware of the potential health risk of radiation particularly after the Hiroshima and Nagasaki atomic bombs in 1945, the extensive nuclear tests and the accidental exposure of the Japanese fishing boat *Lucky Dragon* to the US nuclear test's fallout in 1954.[31] These scientific and political events situated the ICRP in a position to issue recommendations on scientifically uncertain and publicly controversial questions.

[26] The ICPR also remedied its financial situation in the early 1960s with the grants from the Ford Foundation and the affiliated international organisations. See Clarke and Valentin (n 25) 80.

[27] Bo Lindell, H John Dunster, and Jack Valentin, Swedish Radiation Protection Institute, *International Commission on Radiological Protection: History, Policies, Procedures* (1998) SE-171 3, online: <www.icrp.net/docs/Histpol.pdf>. Since 2002, ICRP subjects its draft reports to public consultation which allows professional bodies to provide input to the ICRP. See Clarke and Valentin (n 25) 101.

[28] For instance, in the US, the recommendations of the ICRP have become a 'primary basis for federal government regulation of the nuclear industry'. See *In re TMI*, 67 F 3d 1103 (US Court of Appeals, 3d Cir, 17 October 1995) note 22. The UK's radiological regulation is also based upon the ICRP, as demonstrated by the *Ionising Radiations Regulations* 1999 (IRR99), Statutory Instrument 1999 No 3232. The European Basic Safety Standards Directive, on which the UK's legislation is based, is likewise based on the recommendations of the ICRP. See *Council Directive 96/29/EURATOM of 13 May 1996* (29 June 1996) 39 L159 *Official Journal of the European Communities* 1–114. See also (n 105).

[29] Clarke and Valentin (n 25) 87–9.

[30] See Clarke and Valentin (n 25) 93–4; Lindell (n 5) 88–9. More specifically, the ICRP Publication 9 issued in 1965 'substantially renewed the radiation protection philosophy by moving from deterministic to stochastic effects'. See Clarke and Valentin (n 25) 94. See also Lindell (n 5) 90; ICRP, 'Recommendations of the International Commission on Radiological Protection, Adopted 17 September 1965' (1966) *ICRP Publication 9* 7.

[31] Clarke and Valentin (n 25) 90.

One of the ICRP's standard-setting tasks concerns the formulation of the maximum level of radiation exposure permissible for individuals. Dose limits are designed to ensure that no individual is exposed to radiation risks that are judged to be unacceptable.[32] To establish dose limits certainly requires the assessment of scientific validity of research findings on the health effects; at the same time, however, it is not entirely a scientific undertaking. The setting of dose limits will require a value-judgment about the balance between what is best for society as a whole and what is best for an individual,[33] and by formulating a recommendation, the ICRP necessarily decides on this risk-benefit balance.[34] In such a process, the ICRP initially favoured wider societal benefits, and it has subsequently shifted its emphasis to the protection of individuals.[35]

The ICRP's recommendations, based upon its own risk-benefit analysis, then provide the basis for wider international standards and domestic law. The recommendations are utilised by the IAEA in the promulgation of the

[32] See *ibid*, 97. Dose limits are one of the pillars governing radiological protection, which include the principle of justification (ie, the radiation detriment must be justified against benefit for the exposed individuals and society), the 'ALARA' principle of optimisation (ie, the exposure must be kept 'as low as reasonably achievable' (hence, ALARA), taking into account social and economic factors), and the principle of minimisation (ie, a person's total dose should not exceed dose limit, so that no person is subject to unacceptable risk). See IAEA, *Handbook on Nuclear Law* (Vienna, 2003) 47.

[33] Clarke and Valentin (n 25) 104–5, referring to the balance between 'utilitarian consequence ethics' and 'deontological duty ethics'. If the effect cannot be detected in a given population, the risk of the associated dose may be considered negligible.

[34] Radiological protection is part of the regulation of nuclear activities or 'nuclear law'. According to the IAEA's Handbook on Nuclear Law, the dual focus on risks and benefits is 'a basic feature of nuclear energy legislation', and to balance social risks and benefits is 'the fundamental purpose of any regulatory regime'. See IAEA (n 32) 3, 6. Within the specific context of radiological protection, from its early stage, the ICRP has well recognised that its recommendations involved not only scientific assessment but also certain considerations to ethical and social values. For instance, the ICRP's recommendations revised in 1962 state that 'the Commission has balanced as far as possible the *risk* of the exposure against the *benefit* of the practice' and that 'the Commission … recommended a maximum permissible generic dose of 5 rems, on the basis that the resulting burden to society would be … *tolerable and justifiable in view of the benefits* that may be expected to accrue from the expansion of the practical application of "atomic energy"'. See ICRP, 'Recommendations of the International Commission on Radiological Protection: As Amended 1959 and Revised 1962' (1964) *ICRP Publication 6 (Superseding Publication 1)* 32a, 32c (emphasis added). Compare with ICRP, 'Recommendations of the International Commission on Radiological Protection: Adopted September 9, 1958' (1959) *ICRP Publication 1* 17, 19, 22, 59, which is more ambiguous about the Commission's own role in balancing risks and benefits. According to the ICRP's 2007 Recommendations, 'all of those concerned with radiological protection have to make *value judgments* about the relative importance of different kinds of risk and about the *balancing of risks and benefits*'. See ICRP, 'The 2007 Recommendations of the International Commission on Radiological Protection' (2007) 37 (2–4) *Annals of the ICRP, ICRP Publication 103* 27 *2007 Recommendations*. See also Cousins (n 25) 22 stating, 'Based on science, ethical and social values, and experience'. Similarly, see the following presentation slides: J Lochard, Chair of the ICRP Committee 4, *Application of the Commission's Recommendations: The Activities of Committee 4* (24–26 October 2011), ICRP 2011 Symposium, online: <www.icrp.org/page.asp?id=142>; J Lochard, Chair of the ICRP Committee 4, *Application of the Commission's Recommendations: The 2013–2017 Committee 4 Programme of Work* (22 October 2013), ICRP 2013 Symposium, Opening Session online: <www.icrp.org/page.asp?id=184>.

[35] The shift in emphasis occurred especially from the 1990 Recommendations found in 'Publication 60'. See Clarke and Valentin (n 25) 96–7, 105; Roger H Clarke, 'Changing Philosophy in ICRP: The Evolution of Protection Ethics and Principles' (2003) 1 *International Journal of Low Radiation* 39.

International Basic Safety Standards for radiation protection,[36] and influence standards and documents issued by the UN's specialised agencies such as the WHO, the International Labour Organization and the Food and Agriculture Organization.[37] As noted,[38] the ICRP's publications are widely absorbed into domestic regulation—although, as revealed by the Japanese experience, the national process of adopting transnational science-based standards may overlook their scientific and political limits and weaknesses.

3. Domestic 'incorporation' and contestation: Hiroshima–Nagasaki

The first case of Hiroshima–Nagasaki illustrates how dosimetry systems adopted by the aforementioned RERF and ICRP, as well as the RERF's epidemiological findings endorsed by the ICRP, have been treated by the Japanese government as authoritative scientific standards (Section 3.1), and yet contested by the survivors of the atomic bombs and their supporters (Section 3.2); this has led to the partial modification of the government's deference to transnational scientific models and findings (Section 3.3).

3.1. Domestic 'incorporation'

3.1.1. Domestic legislation on atomic bomb survivors

The uranium and plutonium atomic bombs that dropped in Hiroshima and Nagasaki on 6 and 8 August 1945 exposed a number of people to an active dose of radiation released by the nuclear fission of uranium and plutonium at the time of detonation. In addition, people were also subject to residual radiation from radioactive fallout and induced radioactivity.

For some years, political circumstances both in the US and Japan prevented the long-lasting effects of radiation from becoming part of the national political agendas. Japan was under the allies' occupation until 1952; during this time, the US government controlled the publicly available description on

[36] As taken from IAEA, Jointly Sponsored by European Commission, FAO, IAEA, ILO, OECD/NEA, PAHO, UNEP, and WHO, 'Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards: General Safety Requirements' (2014) *IAEA Safety Standards Series No GSR Part 3*, viii (preface) (original footnote omitted): 'The Board of Governors of the IAEA first approved health and safety measures in March 1960, when it was stated that "The Agency's basic safety standards … will be based, to the extent possible, on the recommendations of the International Commission on Radiological Protection (ICRP)"'. Likewise, IAEA 'Radiation Protection and Safety of Radiation Sources' (this note) xii points out that 'the new edition of the BSS should follow, to the extent possible, the new recommendations of the ICRP'. Finally, the IAEA states that 'the Standards are based primarily on the recommendations of the ICRP'. See IAEA, Jointly Sponsored by FAO, IAEA, ILO, OECD/NEA, PAHO, and WHO, 'International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources' (1996) *IAEA Safety Series No 115*, preface.

[37] Clarke and Valentin (n 25) 102. The recommendations influence many other organisations, such as the European Commission and the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD).

[38] See the examples of the US, UK and EU (n 28).

the effects of atomic bombs,[39] and US government policy to further nuclear armament discouraged public debate on the health effects. The atomic bomb victims themselves long feared that they would be socially discriminated against if they spoke out about the actual and potential effects of radiation to their health.[40]

It was 12 years after the end of the Second World War that the specific legal measures were introduced for the purpose of assisting the survivors of the atomic bombs.[41] This was triggered particularly by the aforementioned incident of *Lucky Dragon*, the Japanese finishing boat exposed to nuclear fallout near the Bikini Atoll in 1954.[42] The revelation of the *Lucky Dragon* incident provoked a public outcry, which forced the Japanese government to provide treatment for the crews, and further led the US government to make an *ex gratia* payment. These governmental supports given to the victims of the *Lucky Dragon* incident in turn evoked a strong sense of unfairness among the atomic bomb survivors, and generated public sympathy towards the survivors.[43]

In 1957, the Japanese Diet enacted the *Medical Care for Atomic Bomb Survivors Act*.[44] The Diet further introduced various allowances under the 1968 *Act on the Special Measures for Atomic Bomb Survivors*.[45] The latter *1968 Act*[46] was particularly in response to the *Shimoda* case of 1963, in which the Tokyo District Court criticised unsatisfactory relief given to atomic bomb victims and regarded the *1957 Act* as 'far from being relief' for the victims.[47] These two pieces of legislation were replaced in 1994 by the *Atomic Bomb Survivors' Assistance Act*.[48]

[39] See Jay Rubin, 'From Wholesomeness to Decadence: The Censorship of Literature under the Allied Occupation' (1985) 11 *Journal of Japanese Studies* 71, 88–91. According to Rubin, 'the Occupation's greatest fear of causing resentment or otherwise disturbing the public tranquillity is manifested in their handling of references to the atomic bombing of Hiroshima and Nagasaki'. See Rubin (n 39) 88.

[40] Genbakushō nintei shūdan soshō kirokushū kankō iinkai (ed), *Genbakushō nintei shūdan sosho tatakai no kiroku: Akiraka ni sareta hibaku no jisso Atomic Bomb Disease Certification Collective Lawsuits, the Records of Battle: Revealing the Truth of Radiation Exposure*, vol 1 (Nihon Hyoronsha, 2011) in Japanese.

[41] For the history of the governmental assistance to survivors, see Akiko Naono, *Hibaku to hoshō Radiation Exposure and Compensation* (Heibon-Sha, 2011) 69–125 in Japanese; Tōkyō genbakushō nintei shūdan soshō o kirokusuru kai The Group of Recording the Tokyo Atomic Bomb Disease Certification Collective Lawsuits, *Genbakushō nintei soshō ga akiraka ni shita koto: Hibakusha to tomoni nani o kachitotta ka Things Revealed by Atomic Bomb Disease Certification Lawsuits: What the Lawsuits Have Achieved Together with Atomic Bomb Survivors* (Akebi Shobo, 2012) 9–18 in Japanese.

[42] Naono (n 41) 88–91.

[43] *Ibid*.

[44] *Medical Care for Atomic Bomb Victims Act*, Act No 41 of 1957 (abolished in 1994) [*1957 Act*] [author's translation].

[45] *Act on the Special Measures for Atomic Bomb Survivors*, Act No 53 of 1968 [*1968 Act*] [author's translation].

[46] *Ibid*.

[47] *Ryuichi Shimoda v The State*, 14(12) Kaminshu 2435, 32 ILR 626 (District Court of Tokyo, 7 December 1963). In *Shimoda*, the Tokyo District Court observed that the dropping of the atomic bombs was contrary to the laws of war's fundamental principle which prohibits unnecessary suffering.

[48] *Atomic Bomb Survivors' Assistance Act*, Act No 117 of 1994 (as last amended 24 June 2011) *1994 Act* [author's translation].

These statutory measures introduced two categories of survivors. First, a relatively wider range of individuals, who were in the cities of Hiroshima and Nagasaki and neighbouring areas, were given the statutory status of 'atomic bomb survivors'.[49] Those survivors who fall into this broad category receive a special health card and periodical health check-ups.[50] The *1994 Act* also entitled the survivors to medical expenses for general diseases which, nevertheless, exclude leukaemia and various kinds of cancer.[51]

More extensive medical care and allowances are provided only to the second category of the survivors, who are additionally certified as suffering from 'atomic bomb diseases',[52] as will be explained below. The certification is accorded by the executive organ, the Japanese Ministry of Health, Labour and Welfare, in consultation with the review board of experts. Once certified, the survivor can receive medical expenses for leukaemia, various kinds of cancer, and other malignant tumours, and a special medical care allowance of approximately 1228 USD[53] per month.

3.1.2. Transnational standards in governmental certification

It was in the process of certifying atomic bomb diseases that transnational radiation standards became relevant. In order to obtain certification, a survivor needed to demonstrate that a person's injury or illness resulted from[54] the 'injurious effect' of atomic bombs, or otherwise his/her healing capacity was affected by the radiation of atomic bombs.[55] The term 'injurious effect' has been understood as 'radiation' in order to justify more favourable treatment

[49] *1957 Act* (n 44) art 2; *1994 Act* (n 48) art 1. In the case of Hiroshima, individuals who were approximately within 5 km from the ground zero during 5–15 August 1945 can be certified as statutory atomic bomb survivors. Apart from those who were in the relevant cities or entered there, statutory atomic bomb survivors include other individuals who transferred or helped people who were exposed to radiation or handled dead bodies which were exposed to radiation [author's translation].

[50] *1957 Act* (n 44) arts 3–4; *1994 Act* (n 48) arts 2, 7.

[51] *1994 Act* (n 48) art 18. The survivors may also be entitled to various allowances, which included healthcare allowance of USD 152–302 per month (JPY 16,670 to 33,230 per month in the year of 2014, calculated by USD 1 = JPY 110) for those who were exposed to radiation within the 2-km zone. See *1994 Act* (n 48) art 28. Also, there was a health management allowance of USD 302 per month (JPY 33,230 per month in the year of 2014) for those who are suffering from particular illnesses (since 1968 for special survivors, and since 1974 for all survivors). See *1994 Act* (n 48) art 27. From 1960 to 1974, there was a distinction between 'general survivors' and 'special survivors' who received a medical allowance for general disease. Yet this distinction was abolished in 1974 [author's translation].

[52] The original term in Japanese is *genbakushō*, which literally means 'atomic bomb symptoms' or 'atomic bomb sicknesses' author's translation. In this paper, I use the translation used often by the Japanese government and the media. See 'Care for A-Bomb Disease Sufferers', Japan Times (20 August 2013), online: <http://www.japantimes.co.jp/opinion/2013/08/20/editorials/care-for-a-bomb-disease-sufferers>.

[53] JPY 135,130 as of April 2014. Calculated by USD 1 = JPY 110.

[54] Art 10(1) of the *1994 Act* provides the term '*ki-in*' in Japanese, which can be translated into 'from', 'stemming from', 'induced by' or 'caused by'. See *1994 Act* (n 48) art 10(1) [author's translation].

[55] *1957 Act* (n 44) art 7(1); *1994 Act* (n 48) art 10(1). In addition, a survivor had to prove that he/she was in need of medical care. See *1994 Act* (this note). Yet the critical issue in the process of certification has been to demonstrate whether or not a person's illness is resulting from the effect of radiation [author's translation].

given to the atomic bomb survivors than that granted to other war survivors who may be likewise in need of medical care and livelihood assistance.[56]

In assessing this requirement, the government employed the dosimetry measure called Dosimetry System 1986 (DS86)[57] as well as the results of epidemiological studies conducted by the ABCC and RERF—the US–Japan research institutions mentioned in Section 2.1. DS86 was developed by a US–Japan joint working group and was approved for use at the RERF by both US and Japanese national dosimetry committees.[58] DS86 was presented to the ICRP, became a basis for the risk estimates for cancer and other diseases, and ultimately provided a basis for the ICRP's recommended dose limits for radiation workers and the general public.[59]

On the basis of transnationally approved dosimetry systems and epidemiological findings, the Japanese government certified radiation-induced illness by the following two steps. The first step was to measure how much radiation a survivor received from the atomic bombs. According to the internal regulations dated September 1994,[60] the government determined a person's radiation dose according to the distance from the hypocentre and the existence of shielding. For instance, if a person was 1.5 km away from ground zero in Hiroshima, their whole body dose is estimated as 50 rad (rad is a unit of radiation dose). If they were at 2 or 2.5 km, the radiation dose would be 7 or 1 rad, respectively. The dose was reduced by 70 per cent if the person was shielded by buildings. The government was supposed to take into account the residual exposure, but the 1994 internal regulations did not provide any further account on this point.[61] As the second step, the government then considered whether a person's estimated dose reached the thresholds for each

[56] Naono (n 42) 104. For the first few years, the Ministry applied a less stringent test, and accepted not only the effect of radiation *per se* but also the effect of heat rays and blast in certifying a person's illness as atomic bomb disease. Yet the introduction of various allowances under the 1968 Act urged the Ministry to apply a more stringent test, accompanied by scientific development on dosimetry systems and health effects. See Naono (this note) 150–3.

[57] RERF, *US-Japan Joint Reassessment of Atomic Bomb Radiation Dosimetry in Hiroshima and Nagasaki, Final Report*, vol 1 (RERF Printing Office, 1987), online: <www.rerf.or.jp/shared/ds86/ds86a.html>.

[58] See George D Kerr, Tadashi Hashizume, and Charles W Edington, 'Historical Overview' in RERF, *US-Japan Joint Reassessment of Atomic Bomb Radiation Dosimetry in Hiroshima and Nagasaki, Final Report*, vol 1 (RERF Printing Office, 1987) 1–13, online: <www.rerf.or.jp/shared/ds86/ds86a.html>.

[59] Committee on Dosimetry for the Radiation Effects Research Foundation, Board on Radiation Effects Research and National Research Council, *Status of the Dosimetry for the Radiation Effects Research Foundation (DS86)* (2001) 7, 9, online: <www.nap.edu/catalog.php?record_id=10103>.

[60] Atomic Bomb Medical Examination Council (ABMEC), 'Certification Criteria (Internal Regulations), 19 September 1994', reproduced in: *Genbakushō nintei shūdan soshō tatakai no kiroku: Akiraka ni sareta hibaku no jissō Atomic Bomb Disease Certification Collective Lawsuits, the Records of Battle: Revealing the Truth of Radiation Exposure*, vol 2 (Nihon Hyoronsha, 2011) 560–2. The internal regulations were revealed only during the lawsuits instituted by the survivors. See M Naito, 'Genbakushō saiban to wa nanika About Atomic Bomb Disease Lawsuits' in Genbakushō nintei shūdan soshō kirokushu kankō iinkai, *Genbakushō nintei shūdan soshō tatakai no kiroku: Akiraka ni sareta hibaku no jisso Atomic Bomb Disease Certification Collective Lawsuits, the Records of Battle: Revealing the Truth of Radiation Exposure*, vol 1 (Nihon Hyoronsha, 2011) 162, 179–180.

[61] ABMEC (n 60) 560–2.

type of illness. For example, if a person's dose is more than 5 rad, his/her leukaemia or thyroid, breast or lung cancer would be considered as radiation-induced. If a survivor's radiation exposure is more than 10 rad, his/her radiation cataract would be considered as radiation-induced.[62]

In response to the Japanese Supreme Court's decision in 2000 (which will be explained in Section 3.2.2), the government revised in 2001 these two certification processes to render them more scientific and more in line with transnationally accepted dosimetry systems and epidemiological findings on health effects. With regard to the first step, the government decided to calculate a person's radiation dose as the total of several measures: (a) initial exposure calculated by the distance from the hypocentre and the existence of shielding,[63] (b) induced radiation calculated by the distance from the hypocentre and the elapsed time from the explosion[64] and (c) radiation from nuclear fallout if a person was in the specified places exposed to radioactive rainfall.[65] The second step is even more complicated. With regard to the types of illness for which the effects of radiation are deterministic, such as radiation cataract, a person's sickness was not certified as an atomic bomb disease unless their radiation exposure was above a particular threshold.[66] As for leukaemia, various kinds of cancers and other malignant tumours, for which the effects of radiation are stochastic (non-deterministic), the *2001 Policy* introduced the idea of the 'probability of causation'.[67] If the probability is more than 50 per cent, the policy estimates that the illness is radiation-induced. If the probability is less than 10 per cent, it does not estimate that the illness is radiation-induced. Probabilities between 10 and 50 per cent would be examined on a case-by-case basis. For instance, suppose that a male survivor, 10-years-old at the time of explosion, subsequently suffered from stomach cancer and the government calculated his radiation dose as 43 centigray (cGy) (a measurement unit of radiation dose). The probability of causation would be approximated at 3.5 per cent, which is below 10 per cent. It would be unlikely for the government to certify his stomach cancer as an atomic bomb disease.[68]

[62] *Ibid*, 561.
[63] For instance, in Hiroshima the estimated doses were 50 centigray (a unit of radiation dose) for 1.5 km zone, 7 centigray for 2 km, and 1 centigray for 2.5 km. See Examination Committee for Certification of Sickness and Disability (ECCSD), 'Examination Policy on Atomic Bomb Disease Certification, 25 May 2001', reproduced in *Genbakushō nintei shūdan soshō tatakai no kiroku: Akiraka ni sareta hibaku no jisso Atomic Bomb Disease Certification Collective Lawsuits, the Records of Battle: Revealing the Truth of Radiation Exposure*, vol 2, documents (Nihon Hyoronsha, 2011) 563–9 *2001 Policy*.
[64] As an example, in Hiroshima the estimated radiation dose is 3 centigray if a survivor was 300 metres away from the hypocentre during the first 24–32 h after the explosion. See ECCSD (n 63) 563–9.
[65] 0.6–2 centigray in the Koi-Takasu areas in Hiroshima, and 12–24 centigray in the Nishiyama-Koba areas in Nagasaki.
[66] Under the *2001 Policy*, the threshold for the illness is set as 1.75 sievert (SV) for radiation cataract.
[67] ECCSD (n 63) 563–9.
[68] Naito (n 60) 186.

3.2. Domestic contestations

3.2.1. Contestations by survivors

The domestic adoption of transnationally approved dosimetry systems (DS86) and epidemiological findings has provided a science-backed justification for the Japanese government to restrict the scope of certificate holders and the amount of medical expenses and allowances provided to the survivors. The governmental reliance on transnationally recognised radiation standards has, however, invited criticism, not only from the survivors and their immediate domestic communities, but also from national courts.

A major point of contention was that the government resorted to the dosimetry method which was designed primarily to assess the direct exposure at the time of the explosion of the atomic bombs.[69] More specifically, the Ministry's reliance on DS86 was seen as problematic in three aspects. First, the government was regarded as discounting *indirect* external exposure from radioactive fallout or neutron-induced radioactive materials. Especially if a person entered the highly contaminated area *after* the explosion, the exposure would not be properly calculated with DS86. Second, the governmental reliance on DS86 was criticised for disregarding *internal* exposure. The survivors may have breathed and inhaled a radioactive particle, or had the radiation contained in foods. Third, if DS86 suffers from these two shortcomings, the epidemiological findings based upon inaccurate radiation dose would be less reliable. Numerical risk estimates are based upon epidemiological findings that are primarily obtained from measuring the relatively high radiation exposure of atomic bomb survivors.[70]

For instance, Ms Ohe, who participated in collective lawsuits explained below, was 16 years old at the time of the Hiroshima–Nagasaki explosion in 1945. She entered Hiroshima city 13 days after the bombing to assist survivors and help dispose of dead bodies at a school 350 metres from the hypocentre.[71] During her seven days of relief activities, Ms Ohe drank the tap water and stayed with other survivors exposed to the initial radiation. After these relief activities, she suffered from constant diarrhoea, melena and hair loss. Ms Ohe recovered from these symptoms, but since her late 30s she suffered from a series of cancers and leukopenia (a decrease in the number of white blood cells). To receive medical assistance, she applied for the certification of atomic bomb diseases in 1998 and again in 2002. The government rejected

[69] The data on the radiation dose of the victims in Hiroshima and Nagasaki concern the instantaneous radiation that would have reached people within about a few kilometres from the hypocentre. See Eiichiro Ochiai, *Hiroshima to Fukushima: Biohazards of Radiation* (Springer, 2013) 143.

[70] See Albrecht M Kellerer, 'Radiation Risk—Historical Perspective and Current Issues' (2002) 22(3A) *Journal of Radiological Protection* A1.

[71] See Naoko Ito, Chieko Tabe and Shigenori Nakagawa, *Hibakusha wa naze genbakushō nintei o motomeru no ka Why Atomic Bomb Survivors Pursue their Atomic Bomb Disease Certification* (Iwanami Shoten, 2006) 7–14 in Japanese.

both applications: the certification criteria estimated the radiation dose from her entry into Hiroshima, 13 days after the explosion, as zero.[72]

The survivors of the Hiroshima–Nagasaki bombings resorted to court proceedings against the governmental refusal to certify their illnesses and injuries as statutory, atomic bomb diseases. The survivors also indirectly criticised the dosimetry system and the associated epidemiological findings, which were approved transnationally and treated as scientifically credible by the Japanese government.

3.2.2. Contestations by domestic courts

Survivors of the bombings have initiated several individual lawsuits since 1969.[73] The landmark decision came in 2000 before the Japanese Supreme Court in the *Matsuya* case.[74] The Supreme Court of Japan expressed reservation about the government's automatic reliance upon the transnationally endorsed DS86 model. The Japanese Supreme Court acknowledged that DS86 was approved by the US–Japan committee as a quality and systematic dose assessment system across the world.[75] Nevertheless, the Supreme Court noted that DS86's estimates still had unknown aspects, and that the automatic application of DS86 and thresholds for radiation effects did not necessarily explain the applicants' conditions.[76]

The *Matsuya* case was followed by the *Azuma* case in 2004,[77] in which the Tokyo District Court and Tokyo High Court likewise rescinded the governmental refusal to grant certification to atomic bomb disease sufferers. The government contended that 'DS86 is said to be the best radiation dose estimation system and has been a basis for ICRP standards and a basic material for radiological protection in the world'.[78] The Courts remained unimpressed by the governmental reliance on transnational standards. The judges found it inappropriate to automatically apply the DS86-based radiation dose estimates

[72] *Ibid*.

[73] Before these collective lawsuits there were only a few cases regarding the certification of atomic bomb diseases. See Naito (n 60) 174–184. Victims' trauma, fear of being discriminated against, and the uncertainty of the certification criteria had suppressed the number of lawsuits. See Naito (n 60) 175–7.

[74] 1998 Gyo-Tsu 43 (Supreme Court of Japan, 18 July 2000) *Matsuya*. In the *Matsuya* case, the applicant was 2.45 km from ground zero in Nagasaki at the time of explosion. Flying debris from the blast hit her head and the injury took longer to heal than doctors anticipated. The right side of her body became partially paralysed. DS86 estimated her radiation dose at 2.092–2.963 rad, which fell short of the estimated threshold for deterministic radiation effects concerning her illnesses. However, the Supreme Court of Japan interpreted the statutory condition as requiring an 'ordinary causal relationship' between the radiation of atomic bombs and the illness. See 1998 Gyo-Tsu 43 (Supreme Court of Japan, 18 July 2000) s II, 3 *Matsuya*. The Court held that the applicant would have to show 'high probability' of the causal relationship in requesting the reversal of the government's refusal to grant certificate. See 1998 Gyo-Tsu 43 (Supreme Court of Japan, 18 July 2000) s II, 2 *Matsuya* [author's translation].

[75] *Matsuya* (n 74) s III–2(2), 7.

[76] *Matsuya* (n 74) s III–3, 7. The Supreme Court observed in the *Matsuya* case that it is possible to recognise the applicant's brain injury as radiation-induced in that her brain injury was exacerbated by considerable radiation exposure. See *Matsuya* (n 74) s III–3, 7–8.

[77] 1999 Gyo-U 141 (Tokyo District Court, 31 March 2004) [*Azuma*].

[78] *Ibid*, 25.

and thresholds from epidemiological studies to the national determination of radiation-induced illness.[79]

In response to the ostensibly more scientific policy that the Japanese government introduced in 2001,[80] a series of collective lawsuits have been launched since April 2003,[81] involving 306 plaintiffs and 17 different district courts.[82] The lawsuits aimed to highlight a gap between the actual effects of the atomic bombs on survivors and the effects predicted by DS86 and epidemiological findings relied upon by the government.[83] The survivors' network and the Japan Confederation of A- and H-bomb Sufferers Organization,[84] accompanied by groups of lawyers and medical experts,[85] have taken initiatives for collective lawsuits. In October 2004, 11 doctors jointly opined that the government 'misused' the radiation epidemiologic studies by systematically applying to individual survivors the 'probability of causation' test solely based on DS86, which did not take into account the effects of residual radiation or internal exposure.[86]

In May 2006, the Osaka District Court delivered the first decision of the collective lawsuits.[87] The Court annulled the governmental decision to

[79] In the *Azuma* case, the Courts held that to determine whether radioactive exposure invited the illness with 'high probability', the government must 'wholly and comprehensively' consider not only epidemiological findings but the context of radiation exposure: the sufferer's behaviour after exposure, their living conditions, their medical reports etc. See *ibid* author's translation.

[80] ECCSD (n 63).

[81] On 17 April 2003, collective lawsuits were launched in the Sapporo, Nagoya and Nagasaki district courts by seven atomic bomb survivors and similar complaints followed. See Tetsuro Miyahara, 'Genbakushō nintei shūdan soshōwa donoyouna undō de ari saiban datta noka About the Atomic Bomb Disease Certification Collective Lawsuits as Movement and Trial' in *Genbakushō nintei shūdan soshō kirokushu kanko iinkai, Genbakushō nintei shūdan soshō tatakai no kiroku: Akiraka ni sareta hibaku no jissō Atomic Bomb Disease Certification Collective Lawsuits, the Records of Battle: Revealing the Truth of Radiation Exposure*, vol 1 (Nihon Hyoronsha, 2011), 38–160, 45–6.

[82] Miyahara (n 81) 47. The list of collective lawsuits has been complied for the Study Group on the Atomic Bomb Disease Certification System of the Japanese Ministry of Health, Labour and Welfare. See the Ministry of Health, Labour and Welfare, the Study Group on the Atomic Bomb Disease Certification System, 'Genbakusho nintei ni kakaru shihō handan no jōkyō ni suite On the Situation of Judicial Ruling Concerning the Certification of Atomic Bomb Diseases' (15 July 2011), in Japanese, online: <www.mhlw.go.jp/stf/shingi/2r9852000001jfuj-att/2r9852000001jg05.pdf>.

[83] Miyahara (n 81) 47–8 (referring to the statement of the lead lawyer).

[84] In Japan, the Confederation is known by its abbreviated name *nihon hidankyō*. The Confederation's website is available at <www.ne.jp/asahi/hidankyo/nihon/english/index.html>.

[85] See Miyahara (n 81) 49–52. A team of doctors to support the collective lawsuits was formed from the Japan Federation of Democratic Medical Institutions.

[86] See 'Genbakushō nintei ni kansuru ishidan ikensho Doctors' Opinion About Atomic Bomb Disease Certification' in *Genbakushō nintei shūdan soshō tatakai no kiroku: Akiraka ni sareta hibaku no jissō Atomic Bomb Disease Certification Collective Lawsuits, the Records of Battle: Revealing the Truth of Radiation Exposure*, vol 2, doc 13 (Nihon Hyoronsha, 2011) 399–422.

[87] 2004 Gyo-U 53 (Osaka District Court, 12 May 2006). As the courts held in the *Azuma* case, the Osaka District Court also directed the government to take a more holistic approach in assessing whether radioactive exposure invited the illness. Similar reasoning was adopted by the Hiroshima District Court on 4 August 2006, which decided the case against the government, and ordered the revocation of the government's rejection of the atomic bomb disease certification for all 41 plaintiffs. See 2003 Gyo-U 11 (Hiroshima District Court, 4 August 2006). The Nagoya District Court, in a 2007 decision, held that the government needs to take into account 'individual and concrete situations' in determining radiation-induced illness. See 2003 Gyo-U 20 (Nagoya District Court, 31 January 2007) [author's translation].

reject certification with regard to all nine plaintiffs. The Osaka District Court joined earlier judicial contestations, and voiced caution against the governmental reliance on DS86 and the radiation epidemiological data. The Osaka District Court observed that 'even the most rational and superior dose assessment system' does not lead to a sufficient estimate about the amount of radiation exposure. The Tokyo District Court in March 2007 more clearly voiced its concern about the automatic application of DS86 to certify atomic bomb diseases.[88] The Tokyo District Court observed that radiation dose assessment based on DS86 could underestimate the dosage of those exposed to radiation further from ground zero or those that came close to ground zero after the explosion.[89] In May 2009, the Tokyo High Court further pointed out that the government, by introducing stringent certification criteria based on then current scientific knowledge, failed to realise the object of the relevant statute: providing compensation to aging atomic bomb survivors.[90]

The response of Japanese courts to this series of collective lawsuits has cast doubt on the domestic adoption of the transnationally recognised DS86 dosimetry system and epidemiological findings. Judicial contestations appear to have targeted three different levels. First, some courts pointed out *scientific uncertainties* in the transnational dosimetry system and epidemiological findings. For instance, the Supreme Court in *Matsuya* noted that the estimate based upon DS86 still included undissolved aspects.[91] Second, national judges were critical of the lack of *accuracy in the application of particular scientific findings* to the regulatory issues in question. The courts indicated that because the DS86 method is primarily based upon direct exposure, the Japanese government must consider case-specific circumstances in certifying atomic bomb disease sufferers.[92] Finally, the courts also criticised the governmental reliance on transnational standards from the perspective of the *separation of powers*. For instance, the Tokyo High Court in May 2009 suggested that the executive organ inaccurately interpreted the object of the relevant statute in devising the stringent assessment policy of the survivors' applications.[93] The domestic court thus required the executive body to be faithful to the intention of the legislature.

[88] 2003 Gyo-U 320 (Tokyo District Court, 22 March 2007).
[89] The Tokyo District Court observed in 2007 that the determination of whether or not illness resulted from radiation must be from the perspective of a 'rational ordinary man' and must 'comprehensively' consider a person's life conditions, clinical records, concrete circumstances of illness, etc. According to the Tokyo District Court, the government has to consider the possibility that radiation exposure would be higher than the estimated amount based upon DS86 by considering *inter alia* a person's radiation exposure, his/her activities after the exposure, and his/her acute symptoms. See *ibid* author's translation.
[90] 2007 Gyo-Ko 137 (Tokyo High Court, 28 May 2009) ch 3(10)(2)(4).
[91] *Matsuya* (n 74) s III–3.
[92] See *Azuma* (n 77).
[93] See 2007 Gyo-Ko 137 (n 90) ch 3(10)(2)(4).

3.3. Domestic 'disincorporation'

These judicial contestations mobilised public opinion, members of the Japanese Diet, and political parties, and eventually led to the partial 'disincorporation' of transnationally recognised radiation standards.[94] In August 2007, Prime Minister Abe decided to revise the criteria for the certification of atomic bomb diseases. After consultation with representatives of the Japan Confederation of sufferers and the involved groups of lawyers, the Ministry published a new examination policy in March 2008 for the certification of atomic bomb diseases.[95] In August 2009, Prime Minister Aso and the Japan Confederation of A- and H-bomb Sufferers Organization exchanged confirmation regarding the conclusion of the atomic bomb disease certification collective lawsuits.[96]

Under the new examination policy,[97] if an individual suffers from cancerous or otherwise malignant tumours, leukaemia or hyperparathyroidism, certification shall be in principle granted as long as (i) the individual was exposed within approximately 3.5 km of ground zero, (ii) entered areas within 2 km of ground zero up to 100 h after the explosion or (iii) stayed within 2 km of ground zero for at least one week for 100 h to 2 weeks after the explosion.[98] If applicants do not meet these conditions for prompt certification, the Japanese government determines radiation-induced illness by taking comprehensive account of the applicant's radiation dose, environmental factors, health history and life history. In short, the new examination policy partially

[94] Miyahara (n 81) 83–103.

[95] ECCSD, 'New Examination Policy' (17 March 2008), in Japanese, online: <www.mhlw.go.jp/bunya/kenkou/genbaku09/08a.html>.

[96] The Japan Confederation of A- and H-Bomb Sufferers Organizations and Japanese Prime Minister Aso, 'Genbakushō nintei shūdan soshō no shūketsu ni kansuru kihon hōshin ni kakaru kakunin sho Confirmation Concerning the Basic Policy on the Conclusion of Atomic Bomb Disease Certification Collective Lawsuits' reproduced in *Genbakushō nintei shūdan soshō tatakai no kiroku: Akiraka ni sareta hibaku no jissō Atomic Bomb Disease Certification Collective Lawsuits, the Records of Battle: Revealing the Truth of Radiation Exposure*, vol 2, document 26 (Nihon Hyoronsha, 2011) 574 (in Japanese).

[97] See ECCSD (n 95).

[98] More specifically, the 2008 version of the policy instructed the government to *proactively* grant the certification to those individuals who suffer from tumours, leukaemia, hyperparathyroidism, radiation cataract or radiation-induced myocardial infarction if those individuals meet one of the three circumstances (ie (i)–(iii) of the main text). See ECCSD (n 95). In the 2009 revision, the government also applied the 'proactive certification' to hypothyroidism, chronic hepatitis, and hepatic cirrhosis as long as these illnesses were 'resulting from radiation'. See ECCSD, 'New Examination Policy' (17 March 2008, revised 22 June 2009), in Japanese, online: <www.mhlw.go.jp/stf/shingi/2r9852000000ycu7-att/2r9852000000yd6a.pdf>. In the 2013 revision, the scientific elements were removed even further. Under the 2013 revision, the certification is in principle granted to those individuals who suffer from tumours, leukaemia, or hyperparathyroidism, if those individuals meet one of the three circumstances (ie (i)–(iii) in the main text). The certification is 'proactively' granted to those individuals who suffer from myocardial infarction, hypothyroidism, chronic hepatitis or hepatic cirrhosis if they were exposed within approximately 2 km from ground zero or within 1 km from ground zero the day after the explosion. The proactive certification is also applied to those individuals who suffer from radiation cataract if they were exposed within approximately 1.5 km from ground zero [author's translation]. See ECCSD, 'New Examination Policy' (17 March 2008, revised 16 December 2013), in Japanese, online: <www.mhlw.go.jp/file/06-Seisakujouhou-10900000-Kenkoukyoku/13_houshin.pdf>.

removed transnationally endorsed scientific methods from the national process of determining entitlement to medical allowances for atomic bomb diseases.

As of March 2014, 8,793 people are certified for atomic bomb diseases and entitled to medical expenses and special allowance.[99] This accounts for 4.5 per cent of the approximately 193,000 people who hold an atomic bomb survivor's health card,[100] and is up from 0.88 per cent before the launch of the collective lawsuits.[101] This increase must be attributed to judicial contestations which both altered the certification criteria and encouraged survivors to apply for the certification.

4. Domestic 'incorporation' and contestation: Fukushima

Albeit in a different context, the Japanese government's deference to transnationally recognised radiation standards repeated in the 2011 Fukushima case (Section 4.1), which invited criticism from various domestic sectors on both scientific and political grounds just as in the Hiroshima–Nagasaki case (Section 4.2).

4.1. Domestic 'incorporation'

The earthquake on 11 March 2011 and the resulting tsunami led to the loss of power in the Fukushima Daiichi nuclear power plants. This resulted in the meltdown of the nuclear fuel rods, the hydrogen explosion of the buildings and the release of radiation into the air and water.[102] The crippled nuclear reactors exposed people, buildings and food to radiation and continues to do so today.

In an ordinary situation, there is a statutory equivalent dose limit of 1 millisievert per year: the maximum level of radiation exposure for the protection of the general public.[103] A millisievert is a unit of radiation dose weighted to take

[99] The latest figure is available on the website of the Japanese Ministry of Health, Labour and Welfare, 'Certification of Atomic Bomb Disease' (17 March 2008, revised 16 December 2013), in Japanese, online: <www.mhlw.go.jp/stf/seisakunitsuite/bunya/kenkou_iryou/kenkou/genbaku/genbaku09/08.html>.

[100] *Ibid*.

[101] Miyahara (n 81) 41.

[102] The facts and causes of the Fukushima nuclear power incident have been investigated by the investigation commissions set up by the power plant operator (TEPCO), the Japanese Cabinet, the Japanese Diet, and a private-sector group. For the Cabinet-led committee's reports in English, see Investigation Committee on the Accident at Fukushima Nuclear Power Stations of Tokyo Electric Power Company, *Final Report* (23 July 2012), online: <www.cas.go.jp/jp/seisaku/icanps/eng/final-report.html>. For the Diet-led committee report in English, see The National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission, *Official Report* (2012), online: <http://warp.da.ndl.go.jp/info:ndljp/pid/3856371/naiic.go.jp/en/report>.

[103] The dose limit was set by an administrative notice in 2000. See Science and Technology Agency (STA) (now Ministry of Education, Culture, Sports, Science and Technology), *The Quantity of Radioactive Isotopes etc.* (23 October 2000), Notice No 5, art 14(4) (2000 Notice). The 2000 Notice implements the

into account its biological effect. This statutory dose limit is based upon the *1990 Recommendations* of the ICRP,[104] which are widely adopted by NEA member states.[105] The ICRP recommended the limit on the basis that the risk factor of cancer from radiation up to 1 millisievert per year would be 5 cases per 100,000 people.[106] The subsequent *2007 Recommendations* of the ICRP also recommended 1 millisievert per year as the protection criteria for the general public.[107]

In theory, the domestic adoption of this ICRP-recommended dose limit could have been contested even before the Fukushima incident in 2011. The first point of debate is scientific. The ICRP's risk assessment owes very much to the epidemiological data obtained from the survivors of atomic bombs in Hiroshima and Nagasaki. As we have seen in the litigations concerning atomic bomb diseases, the epidemiological findings are based on the dosimetry measure DS86 and its predecessor, which were criticised for minimising estimates of radiation exposure.[108] The second point of debate is political. Even if the ICRP's risk assessment is scientifically appropriate, the determination of dose limits for a particular society should not be left entirely to scientific experts. This is because the limit is merely the *permissive* level that balances risks and benefits.[109] The benefits may include the use of

statutory provisions on the management and disposal of radioactive materials. See STA, *Act Concerning Prevention from Radiation Hazards due to Radioisotopes, etc.* (10 June 1957), Act No 167 of 1957 (as last amended by Act No 103 of 13 December 2013), art 19(1); *Order for Enforcement of the Act on Prevention of Radiation Disease due to Radioisotopes, etc.*, Cabinet Order No 259 of 30 September 1960 (as last amended by cabinet order 104 of 29 March 2013); *Ordinance for Enforcement of the Act on Prevention of Radiation Disease due to Radioisotopes, etc.*, Ordinance of the Prime Minister's Office No 56 of 30 September 1960 (as last amended 29 March 2013), arts 19(1)(2)(Ha), 19(1)(5)(Ha). These statutory and administrative instruments are ultimately based on the Atomic Energy Basic Act, Art 20 of which provides: 'In order to prevent radiation hazards and to ensure public safety, the regulations on the manufacture, sale, use, measurement, etc. and any other safety and health measures relating to radioactive materials and radiation generating devices shall be provided separately by an Act'. See *Atomic Energy Basic Act*, Act No 186 of 19 December 1955 (as last amended by Act No 47 of 27 June 2012), art 20 (Measures for Prevention of Radiation Hazards) author's translation.

[104] ICRP, '1990 Recommendations of the International Commission on Radiological Protection' (1991), 21 (1–3) *Annals of The ICRP, ICRP Publication 60 1990 Recommendations*.

[105] See Valentin (n 3) 4–5. According to Valentin's summary, 'with the exception of the United States, NEA OECD's Nuclear Energy Agency member states have all implemented the recommendations in the ICRP's '1990 Recommendations' of *Publication 60*. See Valentin (n 3) 1. While the only exception is the US, the US regulation does not conflict with the *1990 Recommendations*. See Valentin (n 3) 5. Instead, the recommendations of the ICRP have become a 'primary basis for federal government regulation of the nuclear industry'. See *In re TMI* (n 28) 1112, note 22.

[106] The ICRP's *2007 Recommendations* affirmed the risk coefficient presented in the *1990 Recommendations*. See ICRP (n 34) 87.

[107] See ICRP (n 34) 116 table 8 (Comparison of Protection Criteria Between the 1990 and the 2007 Recommendations).

[108] See Section 3.2.2.

[109] As the ICRP stated in 1959, a limitation of the exposure 'necessarily involves a compromise between deleterious effects and social benefits'. See ICRP (n 34) 59. Radiation dose limits are about the acceptability of risk as pointed out by the ICRP's *1965 Recommendations*: man 'must recognize that there is a degree of risk and must limit the radiation dose to a level at which the assumed risk is deemed to be *acceptable* to the individual and to society in view of the *benefits* derived from such activities'. See ICRP (n 30) 34 (emphasis added).

nuclear power plants and the development of nuclear weapons. But the intricacy is such that those who benefit from the use of nuclear power may not be those most at risk of the harms of radiation.[110] The determination of dose limits thus necessarily involves social and political risk-benefit analyses,[111] which should be in part left to governmental bodies, workers, and the wider public.

In fact, the need for political and social input has been recognised by the ICPR. Its *1959 Recommendations* note that 'the factors influencing the balancing of risks and benefits will vary from country to country and that the final decision rests with each country'.[112] The ICRP's report concerning the application of its *2007 Recommendations* points out that the process of selecting a dose limit 'should also be carefully balanced to appropriately include the views of all relevant stakeholders'.[113]

National processes of adopting the ICRP's recommendations, however, may not fully acknowledge the role of wider public scrutiny. This is because the reliance on the ICRP-recommended dose limits can help governments avoid the aforementioned, complex scientific and political discussions. While the scientific integrity of the ICRP often induces national regulatory organs to abide by its recommendations, it may also be a convenient way for them to avoid a difficult political process of balancing benefits and risks at the domestic level.

The domestic political convenience of emphasising the authoritativeness of the ICRP standards became visible in Japan after the Fukushima nuclear accident. In response to the release of radiation from the nuclear reactors, the Japanese government decided to raise the legally permissible level of radiation exposure for the general public from 1 to 20 millisieverts per year.[114] It did so

[110] Nakagawa provides a critical assessment of a longstanding connection between internationally adopted radiological standards and the politics of nuclear power. See Y Nakagawa, *Hōshasen hibaku no rekishi: Amerika genbaku kaihatsu kara Fukushima genpatsu jiko made History of Radiological Exposure: From the US's Atomic Bomb Development to the Fukushima Nuclear Power Plant Accident* (Akashi Shoten, 2011) in Japanese.

[111] See (n 34).

[112] ICRP, 'Recommendations of the International Commission on Radiological Protection: Adopted September 9, 1958' (n 34) 17; ICRP, 'Recommendations of the International Commission on Radiological Protection: As Amended 1959 and Revised 1962' (n 34) 17.

[113] ICRP, 'Application of the Commission's Recommendations to the Protection of People Living in Long-term Contaminated Areas After a Nuclear Accident or a Radiation Emergency' (2009) 39 (3) *Annals of the ICRP, ICRP Publication 111* 49.

[114] See (n 116, 118). Takeshi Oshima, 'Fukushima daiichi jiko no hinan shiji kaijo no kijun o meguru keii Background Regarding the Standards for the Lifting of Evacuation Orders on the Fukushima Daiichi Nuclear Power Accident' (2014) 353 *Rippo To Chosa* 58 (in Japanese). While the present paper discusses the dose level applicable to the ordinary population, the government also raised the exposure dose limit from 100 to 250 millisieverts for nuclear-related workers in emergency situations. See Ministry of Health, Labour and Welfare, Ordinance No 23 of 15 March 2011. The ICRP's recommendations were likewise frequently referred to by the government in explaining the adoption of higher dose limits. See 177th Session of the Japanese Diet, House of Councillors *sangiin*, Committee on Health, Welfare and Labour (24 March 2011) (Ritsuo Hosokawa, Minister of State); Committee on Health, Welfare and Labour, Minute No 10 (19 May 2011) (Ritsuo Hosokawa, Minister of State).

based on the ICRP's 2007 Recommendations, which allow for higher dose limits in case of emergency situations and their aftermath.[115] By way of administrative notices and instructions, the government employed the higher dose limit in determining evacuation areas[116] and restricting the use of school buildings and playgrounds in Fukushima.[117] On 19 April 2011, the Japanese government adopted 1–20 millisieverts as the interim range with which to determine the availability of schools and playgrounds to children.[118] The government did so 'in consideration of international standards',[119] and referred to the ICRP's 2009 report[120] and its Fukushima-specific statement that reiterated

[115] More specifically, the *2007 Recommendations* provide 20–100 millisieverts as reference levels (ie, the level of residual dose above which it is judged to be inappropriate) for the situations of 'emergency exposure' and 1–20 millisieverts for situations of 'existing exposure' that follow. See ICRP, '2007 Recommendations of the International Commission on Radiological Protection' (n 34) 15, 116–7. The level of 20 millisieverts set for the evacuation area immediately after the Fukushima incident was based on the lower limit for the situations of 'emergency exposure'. On the other hand, the level of 20 millisieverts set for the availability of school buildings and playgrounds was based on the recommended limit for situations of 'existing exposure'.

[116] On 22 April 2011, the Japanese government first employed the 'emergency exposure' level of 20–100 millisieverts (see (n 115)) in determining a 'deliberate evacuation area' (*keikaku hinan kuiki*). See Cabinet Office, 'The Establishment of "Deliberate Evacuation Areas" and "Evacuation-Prepared Areas in Case of Emergency"' (22 April 2011), Act No 156 of 17 December 1999, issued in accordance with the Special Measures Concerning Nuclear Emergency Preparedness, in Japanese, online: <www.kantei.go.jp/saigai/20110411keikakuhinan.html>. On 26 December 2011, the government employed 20 millisieverts as a standard for revising the evacuation instructions. See Cabinet Office, Nuclear Emergency Response Headquarters, 'Basic Concept and Issues to be Challenged for Rearranging the Restricted Areas and Areas to which Evacuation Orders Have Been Issued Where Step 2 Has Been Completed' (26 December 2011), s 2(1)(E), in English, online: <www.meti.go.jp/english/earthquake/nuclear/roadmap/pdf/20111226_01.pdf>. This 'Basic Concept' is based upon the then Japanese Nuclear Safety Commission's opinions, which refer to the ICRP's recommendations. See Nuclear Safety Commission of Japan, 'Standpoint of the Nuclear Safety Commission for the Termination of Urgent Protective Actions Implemented for the Accident at Fukushima Dai-ichi Nuclear Power Plant' (4 August 2011), in English; Nuclear Safety Commission of Japan, 'Basic Policy of the Nuclear Safety Commission of Japan on Radiation Protection for Termination of Evacuation and Reconstruction' (19 July 2011), in English. The Japanese Nuclear Regulatory Authority, the successor to the Nuclear Safety Commission, continued to refer to the level of 20 millisieverts based upon the ICRP's recommendations with a stronger emphasis on the protection of individuals. See Nuclear Regulatory Authority of Japan, 'Practical Measures for Evacuees to Return their Homes' (20 November 2013), s 2(A), online: <https://www.nsr.go.jp/data/000067234.pdf> author's translation.

[117] See (n 118–19).

[118] Ministry of Education, Culture, Sports, Science and Technology (MEXT), 'Notification of Interim Policy Regarding Decisions on Whether to Utilize School Buildings and Outdoor Areas within Fukushima Prefecture' (19 April 2011), No 23-Monka-Su-134 (2011, Sports and Youth Bureau, MEXT No 134), in Japanese, online: <www.mext.go.jp/a_menu/saigaijohou/syousai/1305173.htm> (Interim Policy). In response to the criticisms (see (n 122–24)), the government, while maintaining the Interim Policy dated 19 April 2011, issued a statement that the MEXT would use the annual dose of 1–20 millisieverts 'as a guide level' and aim to reduce the annual dose to 1 millisievert or less. See MEXT, 'Immediate Measures toward Reducing the Radiation Doses that Pupils and Others Receive at Schools, etc. in Fukushima Prefecture' (27 May 2011), in English, online: <www.mext.go.jp/english/incident/1306613.htm>.

[119] MEXT, 'Interim Policy' (n 118).

[120] ICRP, 'ICRP Publication 109: Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations' (2009) 39 (1) *Annals of the ICRP* Publication 109. Publication 109 serves to assist in the application of the ICPR's 2007 Recommendations. See ICRP, '*2007 Recommendations* of the International Commission on Radiological Protection' (n 34).

its recommendations on radiation dose limits shortly after the Fukushima incident.[121]

4.2. Domestic and international contestations

The adoption of 20 millisieverts as the upper limit of permissible exposure was within the ICRP's recommended range and was necessary to limit evacuation zones and associated compensation. If the government had strictly applied the 1 millisievert statutory limit, it would have had to evacuate a far larger number of residents. Nevertheless, this governmental decision has invited a public outcry. In particular, the 20 millisieverts upper limit of permissible exposure even for school children, at least initially, was criticised both domestically[122] and internationally.[123] Concern was also raised by a special rapporteur to the UN Human Rights Council in his 2013 report.[124] In the report, the special rapporteur challenged the Japanese government's reliance on the ICRP recommendations. The rapporteur referred to epidemiological findings on the causal links between long-term exposure to low-dose ionising radiation and the increased incidence of cancer.[125]

In response to criticisms at home and abroad, government officials have repeatedly invoked international standards. The government has stressed, from time to time, that the ICRP recognised the yardstick of 20 millisieverts as a permissible level after the Fukushima emergency.[126] The frequent

[121] ICRP, *Fukushima Nuclear Power Plant Accident* (21 March 2011), Ref 4847-5603-4313, online: <www.icrp.org/docs/Fukushima%20Nuclear%20Power%20Plant%20Accident.pdf>. The ICRP notes that the 'Commission continues to recommend choosing reference levels in the band of 1 to 20 mSv per year, with the long-term goal of reducing reference levels to 1 mSv per year'. See *ibid*.

[122] See Japan Federation of Bar Associations, 'Statement Concerning the Government's "Provisional Guideline for the Utilization of School Buildings, Grounds, and Related Facilities in Fukushima Prefecture"' (22 April 2011), online: <www.nichibenren.or.jp/en/document/statements/year/2011/20110422.html>; J Watts, The Guardian, 'Fukushima Parents Dish the Dirt in Protest over Radiation Levels' (2 May 2011), online: <www.theguardian.com/world/2011/may/02/parents-revolt-radiation-levels>; H Tabuchi, The New York Times, 'Angry Parents in Japan Confront Government Over Radiation Levels' (25 May 2011), online: <www.nytimes.com/2011/05/26/world/asia/26japan.html>.

[123] See T Ruff, International Physicians for the Prevention of Nuclear War, 'Children of Fukushima Need Our Protection' (26 April 2011), online: <http://peaceandhealthblog.com/2011/04/26/children-of-fukushima>; International Physicians for the Prevention of Nuclear War, 'Letter to the Japanese Minister of Education, Culture, Sports, Science and Technology' (29 April 2011), online: <http://pgs.ca/wp-content/uploads/2008/03/JapanMinistry042911.pdf>.

[124] UN Human Rights Council 'Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health, Anand Grover, Addendum, Mission to Japan (15–26 November 2012)' (31 July 2013) UN Doc A/HRC/23/41/Add.3 (the advanced version of the report was published initially on 2 May 2013).

[125] *Ibid*, [10].

[126] The government made frequent references to the ICRP. A few examples from the exhaustive list follow: (1) for the government's accessible Q&A to the general public in which it referred to the ICRP's reference level as an international standard, see Cabinet Office, 'Q&A about Radiation Dose Standards' (2 May 2011), in Japanese, online: <www.kantei.go.jp/saigai/faq/20110502genpatsu_faq.html> Q3; (2) for references to the ICRP in parliamentary debate see, for example, (i) 177th Session of the Japanese Diet, House of Representatives *shugiin*, Special Committee on Youth Affairs, Minute No 3 (20 April 2011) 3 (Ikuko Arimatsu, an expert witness *sankōnin* for the government); (ii) Joint Committees on

reference to the ICRP can also be seen in Japan's comments on the aforementioned report of the UN special rapporteur: the Japanese government noted that it set the evacuation areas in Fukushima 'based on the globally accepted recommendation of the ICRP',[127] which they believed already took into account the effects of low-dose exposure on health.[128]

The introduction of higher dose limits has led some Fukushima residents to initiate judicial proceedings and contest the governmental failure to protect them from radiation exposure.[129] At the same time, as was in the case of the lawsuits following Hiroshima–Nagasaki, the objections indirectly targeted the ICRP's recommendations, which the Japanese government treated as authoritative.

In June 2011, 14 children in the city of Koriyama in the Fukushima prefecture brought legal action against the local government. The residents claimed that the local government should evacuate the children and provide educational activities where the accumulated radiation dose would not exceed the statutory limit of one millisievert per year. While in December 2011 the Fukushima District Court rejected the local residents' claims on the basis that there was no imminent risk to the children,[130] the Court still referred to criticism against the ICRP's dose limits and its disregard for the impact of internal exposure. The court also made reference to the European

Economy and Industry and on Cabinet, Minutes No 1 (27 April 2011) 7 (Yukio Edano, Chief Cabinet Secretary); (iii) Committee on Audit and Oversight of Administration, Minute No 3 (27 April 2011) 13 (Itaru Watanabe, an expert witness for the government); (iv) Committee on Education, Culture, Sports, Science and Technology, Minute No 8 (27 April 2011) 11–2, 19 (Takafumi Goda, an expert witness for the government, and Yoshiaki Takagi, Minister of State); (v) Committee on Education, Culture, Sports, Science and Technology, Minute No 10 (18 May 2011) 21 (Takafumi Goda, an expert witness for the government); (vi) 177th Session of the Diet, House of Councillors *sangiin*, Special Committee on Disasters, Minute No 5 (20 April 2011) 7, 11 (Ryuzo Sasaki, Vice Minister, and Yoichi Ito, an expert witness for the government); (vii) Committee on Cabinet, Minute No 6 (21 April 2011) 2–3 (Yukio Edano, Chief Cabinet Secretary, referring to 20 millisieverts as the lowest standard 'within international organizations'); (viii) Joint Committees on Financial Affairs, on Health, Welfare and Labour, and on Land, Infrastructure, Transport and Tourism, Minute No 1 (1 May 2011) 7, 10 (Itaru Watanabe, an expert witness for the government); (ix) Committee on Budget, Minute No 14 (2 May 2011) 16 (Yoshiaki Takagi, Minister of State); (x) Committee on Education, Culture and Science, Minute No 8 (17 May 2011) 11, 14 (Yoshiaki Takagi, Minister of State, saying, 'as I have mentioned a number of times, I have determined the matter in accordance with the ICRP—within this international standard. It is one of the yardsticks, taking into account various experts' opinions'); (xi) 179th Session of the Diet, House of Councillors *sangiin*, Committee on Economy, Trade and Industry, Minute No 2 (27 October 2011) 37 (Yukio Edano, Minister of State); (xii) 180th Session of the Diet, House of Representatives *shugiin*, Special Committee on Reconstruction after the Great East Japan Earthquake, Minute No 5 (7 March 2012) 8 (Yasuhiro Nakane, Parliamentary Secretary). Just to stress, these are only a few examples.

[127] UN Human Rights Council, 'Comments of Japan on the Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health (15–26 November 2012)' (27 May 2013) UN Doc A/HRC/23/41/Add.5/Rev.1, 8.

[128] *Ibid*, 16.

[129] There are a wide range of lawsuits regarding the Fukushima incident, and the citizens' action to launch collective lawsuits for the evacuation of children is one of them. The citizens' group also launched a website on the Fukushima Collective Evacuation Trial at <http://fukushima-evacuation-e.blogspot.jp> (in English).

[130] 2011 Yo 29 (Fukushima District Court, 16 December 2011).

Committee on Radiation Risk (ECRR), which sets the dose limit to the lower 0.1 millisievert per year. On appeal, the Sendai High Court in April 2013 likewise rejected the claim that the government was obligated to evacuate the children in Fukushima.[131] It remains to be seen how future litigations regarding the Fukushima incident will involve the ICRP and whether judges will question the government's reliance on the ICRP's standards. The political sensitivity of the issue may discourage judges from engaging in review of the governmental reliance on transnationally endorsed radiation standards.

5. Transnational science-based standards in the national legal order

The two Japanese stories on the domestic reception of transnational radiation standards provide us with a hint of a much wider, often neglected issue. I referred to this larger issue in the introduction: namely, the scientific (Section 5.1) and political (Section 5.2) fragility of transnational science-based standards adopted at the national level. Such standards, perhaps inevitably, suffer from scientific uncertainty and limited political input. As demonstrated in the two Japanese experiences, these scientific and political limits can be both veiled and unveiled at the national level.

5.1. Scientific vulnerability

One of the noteworthy features of the two Japanese cases explained above is the Japanese government's strong deference to transnationally recommended scientific models, findings and limits. There are perhaps good reasons for such deference. The RERF's decades of epidemiological studies involved many subjects and provides valuable data on the effect of ionising radiation.[132] The recommendations of the ICRP—in conjunction with the scientific consensus built upon by UNSCEAR and the epidemiological findings of the US–Japan institute—have been widely utilised by domestic regulatory organs,[133] the IAEA and other international organisations.[134]

Domestic contestations against the Japanese government's deference nevertheless highlight at least three aspects of *scientific* fragility of domestically accepted, transnational radiation standards. First, the survivors of the Hiroshima–Nagasaki bombings questioned the scientific accuracy, or at least limited use, of DS86 as a method to estimate radiation dose.[135] During the collective lawsuits that followed Hiroshima–Nagasaki, several doctors

[131] 2012 Ra 12 (Sendai High Court, 24 April 2013).
[132] See (n 22).
[133] See (n 28, 105).
[134] See (n 36–37).
[135] See s Section 3.2.1.

pointed out that DS86 effectively disregards the effects of residual radiation and internal exposure.[136] In a series of individual and collective lawsuits, the Japanese courts have found merit in this objection from a scientific viewpoint. Second and more fundamentally, the scientific evidence on the 'stochastic' (non-deterministic) effects of low-level exposure can be obstinately contradictory. Amid ongoing controversies, the decentralised web of scientific and regulatory bodies, including the UNSCEAR and the ICRP, extracts the best available scientific findings and endorses radiological standards which, perhaps inevitably, invite criticism from a segment of the scientific community.

Finally, it must also be noted that domestic contestations point to the inherent limits of statistical data. With regard to the Hiroshima–Nagasaki case, it was necessary for the government to rely on statistical data to calculate the extent to which radiation induced a victim's illness. A statistical, numerical threshold also helped make the certification processes less discretionary. At the same time, statistical data are not meant to explain the survivors' symptoms on an individual basis. If the government relies on statistics in determining the level of correlation between radiation and illness, their decisions will necessarily exclude some whose illness was indeed radiation-induced, but benefit some whose illness was not caused by radiation. This invited dissatisfaction, which should be ascribed to the nature of statistical data. The Hiroshima–Nagasaki case thus reveals the difficulties of employing statistical scientific data in the political determination of who ought to be entitled to medical benefits and allowances.

Despite these three scientific limits, in the Japanese stories discussed, the government regulators emphasised the scientific credibility of internationally acknowledged dosimetry systems, epidemiological findings and dose limits. The emphasis on scientific credibility paradoxically invited further contestations from various domestic and international sectors.

5.2. Political vulnerability

The scientific vulnerability discussed above is accompanied by *political* vulnerability. Not surprisingly, transnational, science-based standards can be formulated with little political input from domestic public organs, private entities or individuals, upon whom the standards may have visible consequences.[137] At the transnational level, the standard setting by non-governmental, independent bodies (eg the ICRP) naturally allows no governmental representation. Additionally, inter-governmental bodies (eg the UNSCEAR) may

[136] See (n 86).

[137] The limited domestic input is common to many other non-binding transnational standards. See Deirdre Curtin and Linda Senden, 'Public Accountability of Transnational Private Regulation: Chimera or Reality?' (2011) 38 *Journal of Law and Society* 163.

not mix representation from governmental regulators, workers and other potentially affected individuals. At the national level, non-binding transnational standards are not subject to parliamentary approval required for the conclusion of formal treaties. National regulators may readily defer to transnational radiation standards that serve regulatory uniformity. Judges and the general public may refrain from reviewing the governmental deference due in part to the scientific technicality of the standards.

Domestic contestations against the Japanese government's deference reveal its neglect of the political vulnerability of transnational radiation standards. In the case of Hiroshima–Nagasaki, the government failed to engage in public deliberation in determining who ought to be entitled to medical benefits. This is a political problem that could have been alleviated before the introduction of the assessment policy in 2001.[138] The Japanese government has circumvented political engagement by emphasising the scientific integrity of measurements and standards developed by transnational expert institutions. In the Hiroshima case, the government repeatedly stressed that the certification policies were 'scientific'[139] measures and that the dosimetry system developed by the US–Japan institution was widely accepted internationally, including by the ICRP. Similar avoidance was repeated in the case of Fukushima, in which the government persistently invoked the ICRP in order to alleviate public anxiety about the adoption of higher dose limits.[140] Despite the need for domestic political input, the Japanese government has yet to subject internationally recommended standards to wider domestic political deliberation, even years after the Fukushima incident.

The neglect of the political and scientific limits of transnational, science-based standards is problematic. As noted,[141] radiation standards should more often involve non-scientific (political, social and legal) determination of the risk-benefit balance in addition to scientific risk assessment. While input on the former (ie science) is provided by scientific experts, the input on the latter (ie risk-benefit balance) can be provided by legislators, regulatory officials, judges, NGOs and the wider public, whose observations make a material difference to the standards.

This dual vulnerability should not be overlooked. The deference of domestic governments to transnational bodies can be readily motivated not only by their scientific expertise but also by political convenience. In the Japanese scenarios of Hiroshima–Nagasaki and Fukushima, there was a strong domestic incentive for the government to invoke transnationally accepted standards: to convince domestic constituencies of their policies and avoid further controversy regarding the scope of medical entitlement and acceptable

[138] On the 2001 assessment policy, see (n 63–68).
[139] 2007 Gyo-Ko 137 (n 90) Exhibit 2.
[140] See (n 126–28).
[141] See (n 33–34, 109).

risk. By stressing the scientific integrity of international standards, the government paradoxically augmented scepticism among survivors, their supporters and the wider public. Scepticism questioned the scientific reliability of the underlying data and the government's avoidance of non-scientific deliberation in adopting transnational science-based standards.

6. Conclusion

Standards developed by international organisations and transnational standard-setting bodies permeate the domestic legal order through multiple norms, actors and processes. If the decisions of international organisations are binding, there is a legal push for all organs of the member states' governments to give effect to the standards in the domestic legal order. Non-binding transnational standards lack such a legal push; yet they still possess a range of persuasive bases, such as expertise, which can encourage their domestic adoption. These persuasive bases can be even stronger than a legal push. In the case of transnational radiation standards, the ICRP's expertise, composition and longstanding records has pushed domestic regulatory organs, including those of Japan, to adopt the ICRP's recommendations and achieve regulatory uniformity.

At the same time, the study of Japanese experiences highlights that national deference to transnational standard-setting bodies can be both augmented and undermined in a domestic political climate. In both of the cases of Hiroshima and Fukushima, the Japanese government repeatedly invoked the scientific integrity of transnationally endorsed dosimetry systems, epidemiological findings and dose limits. The governmental reliance upon transnational standards has invited domestic contestations from civil society organisations and advocacy groups. These contestations, at least in the case of Hiroshima, ultimately mobilised national courts to review the governmental acceptance of transnational standards. Domestic contestations were raised not only on scientific grounds but also on political grounds. The Japanese government avoided the political debate by stressing the scientific integrity of transnational standards. It remains to be seen if Fukushima-related litigations will follow a similar fate. The persistent contestation might eventually convince national judges to question the way science-based standards are employed, as was the case with Hiroshima, but this might be an optimistic foresight.

The contestation of transnational radiation standards on both scientific and political grounds seems to confirm the fragile position of transnational scientific and regulatory institutions. Their role straddles science, law, politics and therefore the divergent criteria of normative foundations, as observed by Oren Perez.[142] Scientific findings on the health effects of radiation exposure

[142] Perez (n 1).

are produced by the US–Japan institute among numerous other research entities worldwide. These findings often contradict one another and create scientific uncertainty. The web of transnational institutions, including the UNSCEAR, the ICRP and the IAEA, inject some certainty in this scientifically uncertain area which still demands regulation. At the same time, their much-needed standard-setting role destabilises the scientific trustworthiness of transnational radiation standards. Despite this fragility, the Japanese government emphasised the scientific credibility of transnational bodies, which invited both scientific and political contestations at home and abroad.

Overall, the study of Japanese stories provides a glimpse of how domestic political and legal contexts vary in the recognition and deference given to transnational standard-setting bodies, and on what basis the application of transnational non-binding standards can be contested at the national level. Transnational science-based standards help facilitate regulatory harmonisation across states in a wide range of regulatory fields, such as health and safety. However, the domestic adoption of transnational standards could, and arguably should, be subject to critical scrutiny by the legislative and judicial organs, as well as by individuals who bear much of the consequences of the domestic adoption of transnationally formulated standards.

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