Supplemental Table 1. IHR-SPAR Indicators for Radiation Emergencies (***Source: References 17,21)***

Level	**C13.1 Capacity and resources**
Level 1	Surveillance mechanisms and resources for radiation emergencies are under development
Level 2	Radiation sources have been inventoried and radiation risk mapping has been conducted and documented
Level 3	Access to specialized health care for radiation injuries is in place AND access to laboratory testing capacity for monitoring, identification and assessment of radiation exposure is in place
Level 4	Access to technical expertise for managing radiation emergencies, including guidelines, protocols and regularly trained experts, is in place AND access to stockpile to support radiation emergency preparedness and response is in place
Level 5	Radiation emergency arrangements are formally evaluated and tested on a regular basis, and improvements are made accordingly

Supplemental Table 2. Selection criteria for each of the health capacity indicators (***Source: References 17,21)***

C1 Legislation and Financing (3 indicators)

C1.1 Legislation, laws, regulations, policy, administrative requirements or other government instruments to implement the IHR

C1.2 Financing for the implementation of IHR capacities response

C1.3 Financing mechanism and funds for timely response to public health emergencies

Rationale: Research, licensing, marketing authorization and procurement procedures for radioactive substances.

C2 IHR coordination and national IHR focal point functions (2 indicators)

C2.1 National IHR Focal Point functions under IHR

C2.2 Multisectoral IHR coordination mechanisms

Rationale: Collaboration and coordination among government bodies, ministries and agencies. These sectors can also include environment, transport, points of entry, travel, radiation safety, disaster management, emergency services, etc.

C3 Zoonotic events and the human-animal interface (1 indicator)

C3.1. Collaborative effort on activities to address zoonoses

Rationale for exclusion: Fundamental health care framework established to battle emerging zoonotic diseases is directly relevant to the management of radiation emergencies.

C4 Food safety (1 indicator)

C4.1 Multisectoral collaboration mechanism for food safety events

Rationale: Problems involving food contamination and food safety needs similar protocols for detection, investigation and response as in radiation emergencies.

C5 Laboratory (3 indicators)

C5.1. Specimen referral and transport system

C5.2 Implementation of a laboratory biosafety and biosecurity regime

C5.3 Access to laboratory testing capacity44 for priority diseases45

Rationale: The biosafety and biosecurity guidelines and regulations can ensure personnel and public safety by minimizing the risk of accidental radiation exposure.

C6 Surveillance (2 indicators)

C6.1 Early warning function: indicator-and event-based surveillance

C6.2 Mechanism for event management (verification, risk assessment, analysis investigation)

Rationale: A sensitive surveillance system can aid timely risk assessment, notification and response, including contact tracing.

C7 Human resources (1 indicator)

C7.1 Human resources for the implementation of IHR capacities

Rationale: Availability of a multisectoral and trained workforce capacity essential for the timely management of the radiation emergencies.

C8 National health emergency framework (3 indicators)

C8.1 Planning for emergency preparedness and response mechanism

C8.2 Management of health emergency response operations

C8.3 Emergency resource mobilization

Rationale for inclusion: Having a robust emergency preparedness and response team can deliver timely response to radiation emergencies.

C9 Health service provision (3 indicators)

C9.1 Case management capacity for IHR relevant hazards chemical and radiation decontamination

C9.2 Capacity for infection prevention and control and chemical and radiation decontamination

C9.3: Access to essential health services

Rationale for inclusion: Strong health care system at primary, secondary and tertiary levels, and availability of an existing emergency health care provision helps urgent response to radiation emergencies.

C10 Risk communication (1 indicator)

C10.1 Capacity for emergency risk communications

Rationale: A real-time exchange of information, advice and opinion can facilitate prevention, reporting and response by enabling health care providers and public to make informed decisions.

C11 Points of entry (2 indicators)

C11.1 Core capacity requirements at all times for designated airports, ports and ground crossings

C11.2 Effective public health response at points of entry

Rationale: Implementing point of entry capacity with an all-hazard and multisectoral approach is an integral part of surveillance and response system.

C12 Chemical events (1 indicator)

C12.1 Resources for detection and alert

Rationale: Chemical events resulting from technological incidents or contaminated foods can be of similar origin, nature or consequences to radiation emergencies.

C13 Radiation emergencies (refer to Supplemental Table 1 for the levels of preparedness)