

La Prevenzione nel Rischio Biologico

Classificazione dei microorganismi
responsabili di infezione

Modalità di trasmissione degli agenti
patogeni

Fattori che influenzano il rischio di
infezione

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Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007



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- **I.B. Precauzioni Standard +
Precauzioni basate sulla via di
trasmissione**
 - I.B.1. **Sorgente**
 - I.B.2. **Ospite**
 - I.B.3. **Via di Trasmissione**
 - I.B.3.a. **Contatto**
 - I.B.3.a.i. **Diretto**
 - I.B.3.a.ii. **Indiretto**
 - I.B.3.b. **Droplet**
 - I.B.3.c. **Aerea**
 - **I.B.4. Emergenti**
 - **I.B.5. Other**

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- **I.C. Agenti infettivi di particolare interesse**

- **I.C.1. Epidemiologico**

- I.C.1.a. *Clostridium difficile*
- I.C.1.b. Multidrug-resistant organisms (MDROs)

- **I.C.2. Bioterrorismo**

- Anthrax, Smallpox (vaiolo), Plague (peste), Tularemia, Viral hemorrhagic fevers, Botulism

- I.C.3. Prions - Creutzfeldt-Jakob disease (CJD)

- I.C.4. Severe acute respiratory syndrome (SARS)

- I.C.5. Monkeypox (Vaiolo delle scimmie)

- I.C.6. Noroviruses (virus di Norwalk)

- I.C.7. Hemorrhagic fever viruses

- Ebola and Marburg viruses, Lassa virus, Crimean-Congo hemorrhagic fever and Rift Valley Fever virus, Dengue, Yellow fever viruses

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- I.E. Rischio di Trasmissione associato allo stato dei pazienti
 - I.E.1. Immunocompromised patients
 - I.E.2. Cystic fibrosis patients
- I.F. Nuove terapie con rischi potenziali
 - I.F.1. Gene therapy
 - I.F.2. Infezioni Trasmesse da Sangue, Organi e Tessuti
 - West Nile Virus infection, cytomegalovirus infection, Creutzfeldt-Jacob disease, hepatitis C, infections with Clostridium spp., group A streptococcus, malaria, babesiosis, Chagas disease, lymphocytic choriomeningitis, rabies
 - I.F.3. Xenotransplantation e tissue allografts

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I.B. Precauzioni Standard e Precauzioni basate sulla via di trasmissione

- La Trasmissione di agenti infettivi richiede tre elementi:
 - Sorgente (o reservoir)
 - In primo luogo umana (portatori di infezione) ma anche ambientale (pazienti, personale, familiari, Visitatori)
 - Ospite suscettibile con porta di ingresso compatibile con l'agente infettivo
 - Fattori rilevanti che influenzano l'infezione e l'insorgenza e la severità della malattia sono legati all'ospite. Tuttavia intervengono le caratteristiche dell'interazione ospite – agente correlate con patogenicità, virulenza, antigenicità, dose infettante, meccanismi di produzione della malattia, via di esposizione
 - Via di trasmissione
 - Specifica per ogni agente infettivo, può anche essere più di una

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- I.B.3.a. Contatto
 - La più frequente si divide in due sottogruppi
 - I.B.3.a.i. Diretto
 - Interviene quando la trasmissione avviene senza contaminazione intermedia di oggetti o persone
 - I.B.3.a.ii. Indiretto
 - Interviene quando la trasmissione avviene con contaminazione intermedia di oggetti o persone
- I.B.3.b. Droplet
 - E' una forma di trasmissione da contatto e alcuni agenti possono essere contemporaneamente trasmessi per contatto diretto o indiretto
- I.B.3.c. Aerea
 - Interviene quando la trasmissione di droplet o di piccole particelle di dimensioni compatibili contenente l'agente che rimane infettivo nel tempo e a distanza

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- I.B.3.d. Problemi emergenti nella trasmissione aerea.
 - I.B.3.d.i. Trasmissione da pazienti
 - SARS nel 2002, monkeypox in USA nel 2003, influenza aviaria
 - I.B.3.d.ii. Trasmissione dall'ambiente
- I.B.3.e. Altre sorgenti
 - Trasmissione di infezioni da sorgenti diverse da individui infetti include le infezioni associate con le abituali sorgenti ambientali o gli abituali veicoli (cibo contaminato, acqua, medicine (fluidi endovena))

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- **II.A. Componenti sistemiche che influenzano l'efficacia delle precauzioni per prevenire la trasmissione**
 - II.A.1. Misure amministrative
 - II.A.2. Cultura istituzionale sulla sicurezza e caratteristiche organizzative
 - II.A.3. Aderenza del personale alle linee guida condivise
- **II.B. Sorveglianza**
- **II.C. Formazione personale, pazienti, familiari, visitatori**
- **II.D. Lavaggio delle mani**
- **II.E. PPE Personal protective equipment**

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- II.F. Prevenzione dell'esposizione a patogeni ematici
- II.G. Regime di assistenza
- II.H. Trasporti
- II.I. Misure ambientali
- II.J. Cura del paziente
- II.K. Biancheria
- II.L. Rifiuti
- II.M. Utensili
- II.N. Misure aggiuntive
 - II.N.1. Chemoprophylaxis
 - II.N.2. Immunoprophylaxis
 - II.N.3. Visitatori

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Type of Precautions

- **A**
 - Airborne Precautions
- **C**
 - Contact
- **D**
 - Droplet
- **S**
 - Standard; when A, C, and D are specified, also use S

Duration of precautions

- **CN**
 - until off antimicrobial treatment and culture-negative
- **DI**
 - duration of illness (with wound lesions, DI means until wounds stop draining)
- **DE**
 - until environment completely decontaminated
- **U**
 - until time specified in hours (hrs) after initiation of effective therapy
- **Unknown**
 - criteria for establishing eradication of pathogen has not been determined

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RECOMMENDATIONS FOR APPLICATION OF ***STANDARD PRECAUTIONS*** FOR THE CARE OF ***ALL*** PATIENTS IN ***ALL*** HEALTHCARE SETTINGS (1)

- Hand hygiene
 - After touching blood, body fluids, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts.
- Personal protective equipment (PPE)
 - Gloves
 - For touching blood, body fluids, secretions, excretions, contaminated items; for touching mucous membranes and non intact skin
 - Gown
 - During procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated
 - Mask, eye protection (goggles), face shield*
 - During procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions, especially suctioning, endotracheal intubation
 - *During aerosol-generating procedures on patients with suspected or proven infections transmitted by respiratory aerosols (e.g., SARS), wear a fit-tested N95 or higher respirator in addition to gloves, gown, and face/eye protection
- Soiled patient-care equipment
 - Handle in a manner that prevents transfer of microorganisms to others and to the environment; wear gloves if visibly contaminated; perform hand hygiene
- Environmental control
 - Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas

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RECOMMENDATIONS FOR APPLICATION OF ***STANDARD PRECAUTIONS*** FOR THE CARE OF ***ALL*** PATIENTS IN ***ALL*** HEALTHCARE SETTINGS(2)

- Textiles and laundry
 - Handle in a manner that prevents transfer of microorganisms to others and to the environment
- Needles and other sharps
 - Do not recap, bend, break, or hand-manipulate used needles; if recapping is required, use a one-handed scoop technique only; use safety features when available; place used sharps in puncture-resistant container
- Patient resuscitation
 - Use mouthpiece, resuscitation bag, other ventilation devices to prevent contact with mouth and oral secretions
- Patient placement
 - Prioritize for single-patient room if patient is at increased risk of transmission, is likely to contaminate the environment, does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection.
- Respiratory hygiene/cough etiquette (source containment of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter e.g., triage and reception areas in emergency departments and physician offices)
 - Instruct symptomatic persons to cover mouth/nose when sneezing/coughing; use tissues and dispose in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation, >3 feet if possible

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- Recommendations
 - These recommendations are designed to prevent transmission of infectious agents among patients and healthcare personnel in all settings where healthcare is delivered
 - **Category IA Strongly recommended** for implementation and **strongly supported** by well-designed experimental, clinical, or epidemiologic studies.
 - **Category IB Strongly recommended** for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale.
 - **Category IC Required** for implementation, as mandated by federal and/or state regulation or standard.
 - **Category II Suggested** for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.
 - **No recommendation**; unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists
- I. Administrative Responsibilities
 - Healthcare organization administrators should ensure the implementation of recommendations in this section
 - I.B.9. Develop and implement policies and procedures to ensure that reusable patient care equipment is cleaned and reprocessed appropriately before use on another patient . Category IA/IC
- II. Education and Training
- III. Surveillance
 - III.A. Monitor the incidence of epidemiologically-important organisms and targeted HAIs that have substantial impact on outcome and for which effective preventive interventions are available; use information collected through surveillance of high-risk populations, procedures, devices and highly transmissible infectious agents to detect transmission of infectious agents in the healthcare facility. Category IA

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- IV. Standard Precautions
 - Assume that every person is potentially infected or colonized with an organism that could be transmitted in the healthcare setting and apply the following infection control practices during the delivery of health care
 - IV.A. Hand Hygiene
 - IV.A.2. When hands are visibly dirty, contaminated with proteinaceous material, or visibly soiled with blood or body fluids, wash hands with either a non antimicrobial soap and water or an antimicrobial soap and water. Category IA
 - IV.A.3.b. After contact with blood, body fluids or excretions, mucous membranes, non intact skin, or wound dressings. Category IA
 - IV.A.5. Do not wear artificial fingernails or extenders if duties include direct contact with patients at high risk for infection and associated adverse outcomes (e.g., those in ICUs or operating rooms). Category IA
 - IV.B. Personal protective equipment (PPE)
 - IV.C. Respiratory Hygiene/Cough Etiquette
 - IV.D. Patient placement
 - IV.E. Patient-care equipment and instruments/devices
 - IV.E.2. Remove organic material from critical and semi-critical instrument/devices, using recommended cleaning agents before high level disinfection and sterilization to enable effective disinfection and sterilization processes. Category IA
 - IV.F. Care of the environment
 - IV.G. Textiles and laundry
 - IV.H. Safe injection practices
 - IV.H.1. Use aseptic technique to avoid contamination of sterile injection equipment. *Category IA*
 - *IV.H.2. Do not administer medications from a syringe to multiple patients, even if the needle or cannula on the syringe is changed. Needles, cannulae and syringes are sterile, single-use items; they should not be reused for another patient nor to access a medication or solution that might be used for a subsequent patient . Category IA*
 - IV.H.4. Use single-dose vials for parenteral medications whenever possible. *Category IA*
 - *IV.H.5. Do not administer medications from single-dose vials or ampules to multiple patients or combine leftover contents for later use. Category IA*
 - *IV.H.6. If multidose vials must be used, both the needle or cannula and syringe used to access the multidose vial must be sterile. Category IA*
 - *IV.H.7. Do not keep multidose vials in the immediate patient treatment area and store in accordance with the manufacturer's recommendations; discard if sterility is compromised or questionable. Category IA*

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TYPE AND DURATION OF PRECAUTIONS RECOMMENDED FOR SELECTED INFECTIONS AND CONDITIONS

- <C><DI> Abscess - Draining, major
 - No dressing or containment of drainage; until drainage stops or can be contained by dressing
- <S><>Abscess - Draining, minor or limited
 - Dressing covers and contains drainage
- <S><>Acquired human immunodeficiency syndrome (HIV)
 - Post-exposure chemoprophylaxis for some blood exposures
- <S><>Actinomycosis
 - Not transmitted from person to person
- Adenovirus infection (see agent-specific guidance under gastroenteritis, conjunctivitis, pneumonia)
- <S><>Amebiasis
 - Person to person transmission is rare. Transmission in settings for the mentally challenged and in a family group has been reported. Use care when handling diapered infants and mentally challenged persons

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	A	B	C	D	E
1	Tipo ▾	Durata ▾	Infezione / Condizione ▾		
120	A.C	DI	Herpes zoster (varicella-zoster) (shingles) - Disseminated disease in any patient Localized disease in immunocompromised patient until disseminated infection ruled out		
145	A	4 days after onset of rash DI in immune compromised	Measles (rubeola)		
158	A.C	A-Until monkeypox confirmed and smallpox excluded C-Until lesions crusted	Monkeypox		
227	A.D.C	DI plus 10 days after resolution of fever provided respiratory symptoms are absent or improving	Severe acute respiratory syndrome (SARS)		
229	A.C	DI	Smallpox (variola see vaccinia for management of vaccinated persons)		
267	A.C	-	Tuberculosis (M. tuberculosis) - Extrapulmonary draining lesion)		
269	A	-	Tuberculosis (M. tuberculosis) - Pulmonary or laryngeal disease confirmed		
270	A	-	Tuberculosis (M. tuberculosis) - Pulmonary or laryngeal disease suspected		
302					
303					
304					
305					

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	A	B	C	D	E
1	Tipo ▼	Durata ▼	Infezione / Condizione ▼		
2	C	DI	Abscess - Draining major		
20	C	DI	Bronchiolitis (see respiratory infections in infants and young children)		
36	C	DI	Clostridium difficile (see Gastroenteritis C. difficile)		
42	C	Until 1yr of age	Congenital rubella		
46	C	DI	Conjunctivitis - Acute viral (acute hemorrhagic)		
59	C	CN	Diphtheria - Cutaneous		
78	C	DI	Furunculosis Infants and young children		
84	C	DI	Gastroenteritis - C. difficile		
90	C	DI	Gastroenteritis - Rotavirus		
108	C	-	Hepatitis viral - Type A - Diapered or incontinent patients		
117	C	Until lesions dry and crusted	Herpes simplex (Herpesvirus hominis) - Mucocutaneous disseminated or primary severe		
119	C	Until lesions dry and crusted	Herpes simplex (Herpesvirus hominis) - Neonatal		
120	A.C	DI	Herpes zoster (varicella-zoster) (shingles) - Disseminated disease in any patient Localized disease in immunocompromised patient until disseminated infection ruled out		
124	C	DI	Human metapneumovirus		
125	C	U 24 hrs	Impetigo		
136	C	U 4 hrs	Lice - Head (pediculosis)		
158	A.C	A-Until monkeypox confirmed and smallpox excluded C-Until lesions crusted	Monkeypox		
	S.C	-	Multidrug-resistant organisms (MDROs) infection or colonization (e.g. MRSA VRE VISA/PSA ESBLs)		

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	A	B	C	D	E
1	Tipo ▾	Durata ▾	Infezione / Condizione ▾		
60	D	CN	Diphtheria - Pharyngeal		
127	D	5 days except DI in immuno compromised persons	Influenza - Human (seasonal influenza)		
129	D	5 days except DI in immuno compromised persons	Influenza - Pandemic influenza (also a human influenza virus)		
150	D	U 24 hrs	Meningitis - Haemophilus influenzae type b known or suspected		
152	D	U 24 hrs	Meningitis - Neisseria meningitidis (meningococcal) known or suspected		
156	D	U 24 hrs	Meningococcal disease: sepsis pneumonia meningitis		
161	D	U 9 day	Mumps (infectious parotitis)		
165	D	DI	Mycoplasma pneumonia		
172	D	-	Parvovirus B19 (Erythema infectiosum)		
174	D	U 5 days	Pertussis (whooping cough)		
177	D	U 48 hrs	Plague (Yersinia pestis) - Pneumonic		
178	D.C	DI	Pneumonia - Adenovirus		
185	D	U 24 hrs	Pneumonia - Haemophilus influenzae type b - Infants and children		
187	D	U 24 hrs	Pneumonia - Meningococcal		
189	D	DI	Pneumonia - Mycoplasma (primary atypical pneumonia)		
193	D	U 24 hrs	Pneumonia - Streptococcus group A - Adults		
194	D	U 24 hrs	Pneumonia - Streptococcus group A - Infants and young children		
213	D	DI	Rhinovirus		
221	D	U 7 days after onset rash	Rubella (German measles) (also see congenital rubella)		
	A.D.C	DI plus 10 days after resolution of fever provided respiratory symptoms are	Severe acute respiratory syndrome (SARS)		

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	A	B	C	D	E
1	Tipo ▼	Durata ▼	Infezione / Condizione ▼		
3	S	-	Abscess - Draining minor or limited		
4	S	-	Acquired human immunodeficiency syndrome (HIV)		
5	S	-	Actinomycosis		
7	S	-	Amebiasis		
8	S	-	Anthrax		
9	S	-	Antrax - Cutaneous		
10	S	-	Antrax - Pulmonary		
	S	-	Arthropod-borne viral encephalitides (eastern western Venezuelan equine encephalomyelitis St Louis California encephalitis West Nile Virus) and viral fevers (dengue yellow fever Colorado tick fever)		
13	S	-			
14	S	-	Ascariasis		
15	S	-	Aspergillosis		
16	S	-	Avian influenza (see influenza avian below)		
17	S	-	Babesiosis		
18	S	-	Blastomycosis North American cutaneous or pulmonary		
19	S	-	Botulism		
21	S	-	Brucellosis (undulant Malta Mediterranean fever)		
23	S	-	Candidiasis all forms including mucocutaneous		
24	S	-	Cat-scratch fever (benign inoculation lymphoreticulosis)		
25	S	-	Cellulitis		
26	S	-	Chancroid (soft chancre) (H. ducreyi)		
28	S	-	Chlamydia trachomatis - Conjunctivitis		
29	S	-	Chlamydia trachomatis - Genital (lymphogranuloma venereum)		
30	S	-	Chlamydia trachomatis - Pneumonia (infants < 3 mos. of age)		

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TABLE 2. CLINICAL SYNDROMES OR CONDITIONS WARRANTING EMPIRIC TRANSMISSION-BASED PRECAUTIONS IN ADDITION TO STANDARD PRECAUTIONS PENDING CONFIRMATION OF DIAGNOSIS*		
Clinical Syndrome or Condition†	Potential Pathogens‡	Empiric Precautions (Always includes Standard Precautions)
DIARRHEA		
Acute diarrhea with a likely infectious cause in an incontinent or diapered patient	Enteric pathogens§	Contact Precautions (pediatrics and adult)
MENINGITIS	<i>Neisseria meningitidis</i>	Droplet Precautions for first 24 hrs of antimicrobial therapy; mask and face protection for intubation
	Enteroviruses	Contact Precautions for infants and children
	<i>M. tuberculosis</i>	Airborne Precautions if pulmonary infiltrate Airborne Precautions plus Contact Precautions if potentially infectious draining body fluid present
RASH OR EXANTHEMS, GENERALIZED, ETIOLOGY UNKNOWN		
Petechial/ecchymotic with fever (general)	<i>Neisseria meningitidis</i>	Droplet Precautions for first 24 hrs of antimicrobial therapy
- If positive history of travel to an area with an ongoing outbreak of VHF in the 10 days before onset of fever	Ebola, Lassa, Marburg viruses	Droplet Precautions plus Contact Precautions, with face/eye protection, emphasizing safety sharps and barrier precautions when blood exposure likely. Use N95 or higher respiratory protection when aerosol-generating procedure performed
Vesicular	Varicella-zoster, <i>herpes simplex</i> , variola (smallpox), vaccinia viruses	Airborne plus Contact Precautions; Contact Precautions only if <i>herpes simplex</i> , localized zoster in an immunocompetent host or vaccinia viruses most likely
	Vaccinia virus	
Maculopapular with cough, coryza and fever	Rubeola (measles) virus	Airborne Precautions

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Clinical Syndrome or Condition†	Potential Pathogens‡	Empiric Precautions (Always includes Standard Precautions)
RESPIRATORY INFECTIONS		
Cough/fever/upper lobe pulmonary infiltrate in an HIV-negative patient or a patient at low risk for human immunodeficiency virus (HIV) infection	<i>M. tuberculosis</i> , Respiratory viruses, <i>S. pneumoniae</i> , <i>S. aureus</i> (MSSA or MRSA)	Airborne Precautions plus Contact precautions
Cough/fever/pulmonary infiltrate in any lung location in an HIV-infected patient or a patient at high risk for HIV infection	<i>M. tuberculosis</i> , Respiratory viruses, <i>S. pneumoniae</i> , <i>S. aureus</i> (MSSA or MRSA)	Airborne Precautions plus Contact Precautions Use eye/face protection if aerosol-generating procedure performed or contact with respiratory secretions anticipated. If tuberculosis is unlikely and there are no AIRs and/or respirators available, use Droplet Precautions instead of Airborne Precautions Tuberculosis more likely in HIV-infected individual than in HIV negative individual
Cough/fever/pulmonary infiltrate in any lung location in a patient with a history of recent travel (10-21 days) to countries with active outbreaks of SARS, avian influenza	<i>M. tuberculosis</i> , severe acute respiratory syndrome virus (SARS-CoV), avian influenza	Airborne plus Contact Precautions plus eye protection. If SARS and tuberculosis unlikely, use Droplet Precautions instead of Airborne Precautions.
Respiratory infections, particularly bronchiolitis and pneumonia, in infants and young children	Respiratory syncytial virus, parainfluenza virus, adenovirus, influenza virus, Human metapneumovirus	Contact plus Droplet Precautions; Droplet Precautions may be discontinued when adenovirus and influenza have been ruled out
Skin or Wound Infection		
Abscess or draining wound that cannot be covered	<i>Staphylococcus aureus</i> (MSSA or MRSA), group A streptococcus	Contact Precautions Add Droplet Precautions for the first 24 hours of appropriate antimicrobial therapy if invasive Group A streptococcal disease is suspected
* Infection control professionals should modify or adapt this table according to local conditions. To ensure that appropriate empiric precautions are implemented always, hospitals must have systems in place to evaluate patients routinely according to these criteria		

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ECDC Threat Assessment

Unknown disease identified in South Africa, 3 deaths, ex-Zambia
10 October 2008 – 14:00

PUBLIC HEALTH ISSUE

Unknown severe disease with risk of transmission

CONSULTED EXPERTS

- Dr Lucille Blumberg, National Institute for Communicable Diseases (NICD), Sandringham, South Africa
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- Dr Arnaud Tarantola, Institut de Veille Sanitaire, France
- Dr Nikki Shindo, WHO Global Influenza Programme, Geneva, Switzerland
- Dr Roberta Andraghetti, Contact point for epidemic intelligence, WHO Euro, Copenhagen, Denmark