White Paper
“Pandemic” for Airports

(Local Management of Infectious Diseases at global Hubs)

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Local management of infectious diseases at global hubs

(think globally; act locally)

Although it is impossible to predict precisely the exact time and scope of a future influenza pandemic, at present, in the estimation of WHO experts, there are now as before clear signs of an impending pandemic with an impact equivalent to that of the "Spanish influenza" which resulted in a death toll of up to 50 million persons in the winter of 1918-1919.

In particular, the endemic occurrence of the avian plague in numerous Southeast Asian countries in 2004, which holds the risk of a new combination of avian and human flu viruses and thus the danger of a pandemic virus with a lack of immunity among the population and insufficient quantities of available vaccine.

Starting with the spread of SARS in 2003, for the first time, even in Germany, all persons bearing medical and political responsibility witnessed a perfectly clear demonstration of the enormous sensibility and delicateness of viral diseases within the framework of a global expansion within just a few days.

A risk analysis for e.g. Germany in the event of a pandemic (Meltzer et. Al.) assumes a rate of disease of 15% in the best case and a rate of disease of 50% in the worst case scenario.

Even given the best case scenario, this means

- 6.000.000 Additional visits to physicians,
- 180.000 hospital admissions and
- 48.000 deaths due to influenza.

A scenario of this kind would be bound to lead to excessive demands on the health system and the economic infrastructure within a short time and result in high economic damage.

Around the world in four days

Within the framework of globalization, we in Europe must assume that outbreaks of infections on other continents represent a substantial threat to the German population within **14-24 hours**.

International travel (the share of transfer passengers, for example, in hubs like Frankfurt,Paris,London is around 50%, i.e., 25,000,000 passengers/year) with continually

- improved connecting flights,
- shorter transit times and
- improved traveling connections hold the danger that, especially additionally considering the so-called “connecting flights”,

of rapid mixing of international passengers in Europe who only have one desire:

<u>To get back home as quickly as possible and consult a physician of their choosing who speaks their language, takes account of their cultural needs and provides them with a feeling of security.</u>

This foreseeable behavior represents a substantial danger for all physicians who are dependent on the cooperation of patients, potential patients and authorities within the framework of combating global infectious diseases nationally and internationally.

Experts reckon with an additional 20% in additive passenger traffic in the first fourteen days after an outbreak, for example, in Asia.

Possibilities for Prevention

From the point of view of preventative medicine and epidemiological hygiene, there are various possibilities for temporarily protecting the population from a pandemic.

In the opinion of the authors, absolute protection is illusory, but given

- A quick decision
- Rigorous implementation and launching of measures
- National and international communications and networking (identical measures at all ports of entry)

it is indeed possible to prevent the spread of the disease and save human lives in the timeframe up until the use of vaccines.

The foremost goal: :

- Protection of the population
- Protection of airport employees
- Averting injury to health and economic damages (airports)
- Clear definition of responsibilities (authorities)
- Clear allocation of expenses (authorities)
- No disadvantaging of an insolated carriers (airports) by the authorities (demand for equal treatment of carriers)
- Timely integration of airport experts in official planning
- Uniform procedures and obligations at national Airports (no disadvantaging of some airports)
- (uniform procedures at all international airports)
- Implementation of ACI (Airport Council International) guidelines; see also the ACI, ICAO, IATA, CDC , ECAC, EU , ECDC ,EAGOSH and WHO websites.

Possible Scenarios at Airports

The possible alternatives are presented and critically discussed on the example of various scenarios.

The basic scenario is the outbreak of a pandemic with a new supervirus

Scenario 1
Outbreak of a pandemic in country X

If the stipulations of the WHO are fulfilled without limitations, then the **medical impact** locally onsite in country X and a spreading of the infection can be prevented and/or substantially minimized through international support with

1. Know-how transfer (WHO, IAOTA,ICAO,CDC, ACI eg.)
2. Manpower (dispatching of international experts including airport experts)
3. Equipment (dispatching of mobile laboratories, etc.)
4. Logistics (experts for logistics, technical support, communications, power supply, eg.)

Prerequisite:
Open, immediate information and communication from country X with the WHO and the neighboring countries.
Immediate implementation – i.e., within hours – of necessary measures of local and international emergency plans.

Possible local, national problems:

1. Political disharmony
2. delayed information in country X
3. delayed communication (internal/external) in country X
4. no adapted emergency plans
5. no local know-how
6. no local experts
7. no local equipment
8. no notification of the population in country X

Consequences:
Experience with SARS (2003),avian influenza (2005, 2006) and influenza H1N1 (2009) has shown that we must accept worldwide that we will not be informed comprehensively or in due time by the countries affected and thus will only be able to use the “Toolbox” (**) of possible measures in a highly differentiated manner with a time delay in order to protect the population.

This means entry and possibly exit screenings at airports and/or “entrance gateways” to Europe.

(**) Toolbox

Within the framework of a toolbox, countries have various possibilities for prevention at their disposal, which can be used according to the local conditions.
These are, among others:

- Entry screening
- Exit screening
- Thermoscanning
- Manual temperature scanning
- Visual medical screening
- Medical examination
- Isolation
- Quarantine
- E.g.

Scenario 2
Outbreak of a pandemic in country X
Arrival of an aircraft from an affected region with a known illness aboard

It is imperative that the affected "key players" comply with the following procedure because isolated activities by individual persons or authorities would result in an organizational chaos which within hours could no longer be corrected.

Procedures:

- Notification of the tower in due time by the Captain
- Immediate notification of local health authorities by the tower
- Immediate notification of the Airport Authority (activation of local emergency plans analogous to BANOT B26 Frankfurt Airport)
- Immediate notification of state and federal police (if necessary, support pursuant to Act on Protection Against Infectious Diseases)
- Special parking position for aircraft
- Provision of busses – e.g., color-coded, see below – with volunteer drivers (otherwise fire department and police)
- Provision of protective clothing (masks, gloves, disposable suits, glasses, disinfectant)
- Provision of informational material for employees and authorities at the airport
- Provision of airport employees, airline representatives for caring for passengers
- Allocation of rooms at the airport for transit passengers and/or for passengers differentiated according to colors (analogous to Hong Kong)

- RED = index patient
- ORANGE= family, tourist party
- YELLOW= 2 meter/6 feet around the index patient
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- GREEN= other passengers

  - Provision of documentation (aircraft seating pattern – who was sitting where – colored stickers, deboarding cards, etc.)
  - A designated physician contacts the captain (clarification of initial information)
  - A physician boards the aircraft accompanied by federal police

Recommodation Frankfurt Airport (2008)

Reduction to a three color coding

- RED = Index Patient
- YELLOW = family, tourist party, Flight att. , pax within 2 meter distance
- GREEN = other paxe and crew members

- **Physician's tasks:**
- Information of passengers in the national language and in English on board
- Initial examination of the index patient on board
- Provision of protective clothing for the index patient on board
- Decision regarding further course of action on board
- If possible, all-clear on board
- Immediate communication with the department of public health/ competence center
- Distribution of informational material to the passengers by assistants (….. please contact your department of public health immediately in the event of medical abnormalities) when passengers disembark (must still be prepared by the department of public health)

- **Other procedures:**
- Support on site by the local Technical Operational Staff as support for the responsible physician on duty
- Further clarification through medical experts (isolated transport, isolation of the remaining passengers until then in assigned rooms under medical care and the supervision of federal and/or state police)
- Clear decision through the local department of public health procedure pursuant to the Act on Protection Against Infectious Diseases and assistance by federal and state police for the temporary isolation until medical experts are able to make a clear statement about possible danger (time required: approx. four hours).
- Integration, for example, of care teams from the airlines and support team through airport (rebooking, lodging, catering, communications, and much more).
- Support for emergency workers (information, communications, catering, and much more)
- Media relations
- Support for meeters and greeters (maximum, coordinated information without uncertainty)

Fundamentals:
Maximum protection of emergency workers and the general population, i.e., if necessary, temporary isolation of passengers until the experts have provided well-founded information.

This, however, means a possible interruption of the flow of passengers and the internal processes for airlines and airports of up to four hours.

Corresponding plans must be prepared at all affected authorities, airlines and airports with timely allowance for “backup systems”
(rooms, communication, catering, support and much more).

How and in what scope should or must passengers be controlled during the flight and/or after the landing?

Experience with SARS (Hongkong) and H1N1 (Bangkok, 2009) in Asia has shown that screening of passengers (temperature measurements), in the opinion of the author, can definitely be justified at a regional level within the framework of a “toolbox", although during the evaluationg of the temperature screening in Hong Kong with

440.000 Passengers
only one passenger was hospitalized, who was not ill with SARS.

In the author’s opinion, however, these results at an international airport are not representative when viewed as a whole, especially taking into account the selection of persons who stay at an airport.

Of the persons screened in Hong Kong, 60% were “business flyers” who, in turn, did not belong to the medical target group.
The remaining 40% of the tourists had also not been staying in the defined risk areas.

Nevertheless, at that time in Asia, temperature screening is still one of the few possibilities for selecting patients who are at risk, defining isolation areas (buildings, streets) and still ensure the orderly continuation of everyday and business life.

In the opinion of the author, applying this method with its “limitations” to European circumstances within the framework of prevention with an unknown virus with or without temperature is **in no way commensurate** with alternative, necessary screening methods.

The “output” is disproportionate to the outlay in terms of material, technology, and personnel; nevertheless, this method is still favored in Asian countries and is a permanent, integral part of their pandemic planning (Hong Kong, Singapore, Bangkok).

Procedures

At Frankfurt Airport (2011) , there are up to **1300** aircraft movements with up to 300 passengers per intternational flight, whereby 50 % of these are transit passengers.

The unusual feature for transit passengers is the short transfer time of 30-**45 minutes**, which makes Frankfurt Airport so appealing for international passengers.

Due to these outline conditions, given the desire for trouble free flight operations, there is a considerable demand on the part of all those involved in the process for standardized procedures that ensure fast, professional handling/care.

A procedure of this kind (BANOT B 26, highly contagious diseases) was developed under the overall control of the airport medical service in close cooperation especially with the competence center of the City of Frankfurt (PHA) and is available to the authorities as well as all other airports (see www.EAGOSH.org).

Differentiated processes and tasks are stipulated for employers and offices. These procedures are standardized and deposited in the internal manuals of the functional staff.

Scenario 3
Outbreak of a pandemic in country X
Arrival of an aircraft from an affected region with a unknown illness aboard

For this scenario, there are various expedient possibilities

(1) Screening aboard the aircraft by a qualified physician with self-protection accompanied by the federal police (visual screening and questioning of the cabin crew, informing of passengers)
(2) Screening at the gate before entering the terminal through
- ❖ Questioning of passengers
- ❖ Thermoscan
- ❖ Manual temperature measurement
- ❖ Visual medical screening by medical assistants
- ❖ Visual screening by physicians

(3) Combination of the aforementioned measures

Screening aboard the aircraft by a qualified physician (entry screening)

Experience gained in 1986 at Frankfurt Airport during the threat by the plague in India has shown that with close cooperation with the public health authorities and the airlines and their physicians it is possible to substantially minimize, through primary visual medical screening and if necessary personal “obligatory examination”, the risk of the bringing-in of persons who have been taken ill.

Initial outlay per aircraft:
1 physician
1 medical assistant
1 federal or state police officer
(Backup system)

Note:
Approx. 48 flights per day land from the affected areas.(Swine Fue 2009)
If an index passenger is identified, then the “routine program” follows with examination, isolated transport and isolation of the remaining passengers until the final medical release.

Competency:
Local department of public health (PHA) with local support by the airport’s experts.

Expenses:
Should be Department of public health

Questioning of passengers (locator card – WHO)

Written questioning of all arriving passengers is provided for in accordance with the international health regulations (IHR May 2005).

The resulting outlay

1) Receipt of the LC
2) Inspection of the LC aboard the aircraft
3) “Selection" of passengers in the event of medical abnormalities
4) Time of documentation (during the flight, upon arrival)
5) Correct completion (fears, etc.)
6) Data protection
7) Storage (Where? According to what system?)

must be analyzed very critically because, in the author’s opinion, the outlay is in no way commensurate with the results.

Especially if one remembers, at the working level, that with 48 aircraft a day with 300 passengers each and an unclear system of filing the LCs (sorting by date, flight number, name, nationality?) human resources at the airport will be exhausted within a very short time and that vital personnel will be tied up unnecessarily.

Furthermore, the time outlay of up to 2 minutes per passenger must also be taken into consideration.
This means an additional outlay of an additional 400 minutes per flight.
This will substantially impede the existing passenger flow.

If this “check” is carried out at or aboard the aircraft, then a collapse of the international connecting flights is foreseeable with a brief time delay of 6 hours.

Outlay:
3 employees per flight, i.e., approx. 30 employees per shift total.
1-2 federal or state police officers

Competency:
Local department of public health with local support by the airport’s experts.

Expenses:
Should be Department of public health

Thermoscan

(analogous to Hong Kong, Singapore, Bangkok SARS, 2003; H1N1 2009)

If one considers taking over the existing thermoscan procedure as it is established currently in Hong Kong, Singapore, Kualalumpur and Bangkok, then the following points must be discussed critically:

i.e.,

- At least 2 health department employees per gate/shift (total: 360 employees/day)
- Material expenses (mechanized scanning x 60 gates)
- Catering for 360 employees in 3-shift operation
- Time outlay per passenger with questioning/without documentation approx. 3-5 minuten x 300 passengers (12.5 hours/with 2 employees/per flight !)
- Time outlay without questioning and without documentation less than 15 seconds

Note:
As a rule, up to 48 fights per day come from the infection areas (see SARS, avia influenza, H1N1).

Advantages of this method:
The time outlay for this method is negligible, since the so-called “passenger flow” is not interrupted.

Competency:
Local department of public health with local support by the airport’s experts.

Expenses:
Should be Department of public health
(approx. 25.000 € per unit, delivery period approx. 6 months); maintenance expenses and possible licensing fees have not been taken into account. Plus personnel expenses.

Note:
If this method is chosen analogous to the countries in Asia, then not only the matter of expenses must be decided right now, but also an appropriate number of devices must be ordered in all countries.

Manual temperature measurement

(analogous to Hong Kong, Singapore, Bangkok SARS, 2003; H1N1 2009)

Analogously to the method of thermoscanning, manual temperature measurements were carried out in Asia during the SARS epidemic.
If this method is chosen, then the following points must be taken into account:

i.e.,

- At least 2 health department employees per gate/shift (total: 360 employees/day)
- Material expenses (hand scanners x 60 gates)
- Catering for 360 employees in 3-shift operation
- Time outay per passenger with questioning/without documentation approx. 5 minuten x 300 passengers (12.5 hours/with 2 employees)

Note:
This method was also used in Asia.
However, even if at least 2 employees are deployed at each gate, it is so time-consuming that a smooth flow of passengers can no longer be ensured and thus flight delays are preprogrammed.

This delay in turn leads to increased passenger traffic in the terminal and an increased risk of infection due to crowds of people.

Competency:
Local department of public health with local support by the airport's experts.

Expenses:
Should be Department of public health
(Expenses per hand scanner approx. 10 €), plus personnel expenses

Visual medical scanning by medical assistants

Taking into account the very tight personnel resources in the event of a possible pandemic, liberal consideration must be given to the deployment of medical assistants (nurses, physicians' assistants, medical students, emergency medical technicians and many others).

Model:
Personnel trained by the departments of public health carry out visual medical screening of arriving passengers as they leave at the "gate finger".

Thus it is possible to carry out an initial visual assessment according to outward appearance after physical exercise (leaving the aircraft and covering a long distance to the terminal).

In the event of unusual findings, the passengers in question are isolated immediately by an officer of the authorities.
Afterwards, medical scanning will be carried out by a physician in the "backup" system (one central physician station for every 10 gates).

To date, the following discussion is unresolved:
What do we do then with the remaining passengers who have already passed through the screenings, e.g., what if the index patient was the last passenger?

Outlay:
2 medical employees at the gate
1-2 federal or state police officers
(1 central physician for every 10 gates)

Competency:
Local department of public health with local support by the airport's experts.

Expenses:
Should be Department of public health

Visual screening by physicians

Visual screening by physicians at the gates as an alternative to the aforementioned procedures is listed only in the interest of completeness and is certainly not an alternative to visual screening by a physician directly aboard the aircraft.

This is especially true since a so-called "backup" system must take place through an additional medical screening in the terminal.

Outlay per aircraft:
1 physician
1 medical assistant
1 federal or state police officer
(Backup system)

Note:
approx. 36 aircraft per day from the affected areas
If an index passenger is identified, then the “routine program” follows with examination, isolated transport and isolation of the remaining passengers until the final medical release.

Competency:
Local department of public health with local support by the airport’s experts.

Expenses:
Should be Department of public health

Physical examination by a physician

A proper medical examination to exclude a possible acute illness is certainly the most useful method within the framework of a qualified statement and prevention.

Legal impediments …… “on what legal basis” ....."I'm not about to submit to an examination", etc. , the time outlay per passenger as well as the knowledge that passengers may well be contagious without evidencing symptoms show us the limits of these useful measures

Outlay:

- At least 2 physicians per gate (60 x 2= 120 physicians, with 12-hour shifts)
- Reduction to crisis regions (30 aircraft/day); i.e., Concentration on so-called collection points (5 central scanning stations), nevertheless still 5x2 physicians
- Rooms will be made available by the airport owner/operator
- Pursuant to the new security regulations (1 January 2005), all external experts must pass a background check by the responsible authorities (duration up until now: 14 days)

Summary:
In the author’s opinion, this is not feasible, especially taking into account the tight personnel resources of physicians, which as a rule are already “tied up” before the outbreak of a pandemic.

An international commercial airport is characterized by numerous, highly complex networks of various experts, companies with directives from their home countries (confidentiality, internal procedures and more), desires from various state and national authorities for which reasonable allowances must be made.

Only close, cooperative and contemporary meshing of these responsible “key players” ensures that an international airport – even if with slight limitations – continues to guarantee the necessary air transport.

The closing of major hubs such as London, Paris and Frankfurt in order to avoid and/or stem the spread of global infectious diseases as depicted, for example, in various computer models as a possibility for protecting the population definitely belongs to the sphere of illusion in the opinion of the authors.

As a rule, international airlines will only stop their flight operations in exceptional cases.

In the event of closure of individual hubs, internationally active airlines are able, by virtue of their international link-ups, to network substitute airports worldwide and thus bring the flows of passengers to e.g. Germany via smaller airports.

This process would be fatal for protection of the population because at present only the “major” commercial airports have sufficient logistics and medical networks at their disposal in order to care for these “quantities” of potential patients on short notice.

Rather, we must succeed in using our entire might, i.e., manpower, experts, material and logistics, to support the international experts, through the countries affected, to combat a primarily ***local problem locally*** *and thus counter a globalization of an infectious disease and/or minimize the risks for the population.*

Influenza pandemic

It cannot be assumed that the development of a pandemic can currently be prevented by antiepidemic or epidemiological hygiene measures, since rapid spreading is to be anticipated due to the high level of contagiousness and the transmission by breathing in the expirated droplets, especially since contagiousness already begins shortly (< 24 hours) after the appearance of clinical symptoms -- unlike with SARS.

Prophylaxis

The most important prophylactic measure as, for example, with an influenza pandemic is timely vaccination.

Regrettably, vaccines for this are available at the earliest 5-7 months after characterization of the pandemic virus, so that during this period we must reckon with an increased number of illnesses and deaths (in 2010, about 14,000 persons died from the “flu” in the Federal Republic of Germany).

Another possibilitity is medicinal prophylaxis with virostatic agents like the neuraminidase inhibitor Tamflu which is also approved for prophylaxis.

The delivery period for medication, however, is currently 7-12 months and it is probable that. in the event of a pandemic, the medication will not be available in sufficient quantities and the public supply (medical supply system!) will not be ensured, although the federal and state governments are stockpiling varying quantities of medication (up to 15% of the respective population).

Above and beyond this, fundamental rules of hygiene must be observed and in the event of outbreaks the use of personal protective gear must be ensured, especially Class FFP2 and FFP3 filtering face pieces provide increased protection in the author's view.

At least in Germany, according to statements by authorities, no prioritization is planned when it comes to distribution of medication (Tamiflu, etc.) for functionaries, neither for utility companies nor for essential sectors of industry (e.g., pharmaceuticals industry, nuclear power stations, airports, etc.) Dr. Wirtz, Euroforum November 2006, Mainz, Epidemic Consultant Hesse)

Passenger lists

For a long time, all experts believed that one could identify risk patients by using the passenger lists and that these lists could make a significant contribution toward initiating further measures.

Regrettably, this is not the case!

These lists -- even if they are available -- are regrettably not very helpful for the experts who are bound to make incorrect decisions when interpreting passenger lists.

Rather, the responsible physician from the authority must gain an initial impression directly onsite in the aircraft – taking self-protection into account – in order to then make the right decisions.

Communication with the medical situation center must be ensured already at this early point in time , e.g., through the local technical operational staff.

Taking into account the possible spread of infectious diseases through air transportation, it is necessary to deal early on with measures (checklists) which can substantially contribute to interrupting the path of infection and/or slowing the spread so that locally the authorities can activate the existing alarm plans.

Urgently necessary measures:

- Actively promote “normal” influenza vaccination among the general population

- Instructions with the support of public media with regard to paths of transmission and the protective measures to be observed.

- Risk assessment and if necessary personal stockpiling of virostatic agents and personal protective gear for occupational groups that are highly endangered or have priority for public utilities and services (e.g., public health service, airport employees, local public transit, power and water supply) and persons with special constellations of risk factors.

- Timely creation of informational fliers with a list of rules for behavior and a checklist for recording employees who have been taken ill at work and documentation of the symptoms/ findings and steps taken.

- Mandatory creation of a staged plan in the company and internal setup of a crisis management group that meets , for example, impromptu at the suggestion of the company physician and stipulates measures (e. g., Vacation for all trainees, meetings and travel only when essential to business, cessation of cafeteria operations, shutdown of ventilation systems, etc.).

- Creation of binding, coordinated procedures

- Implementation of virostatic therapy with acutely ill employees if corresponding agents have been stockpiled at the company.

- Selection of separate rooms for consultation, diagnostics and initial therapy with acutely ill employees and stockpiling of the necessary materials (thermometers, masks, gowns, gloves, protective glasses, disinfectant, throat swabs, etc.).

- Guaranteeing of initial treatment, e.g., through integration of volunteer first aiders, since the possibility cannot be excluded that medical personnel will be taken ill.

- Through proactive steps, the physicians in the company can indeed help to stem a pandemic and minimize the health risks for employees and the economic consequences for the business.

Consistent, timely integration of the responsible authorities and partners (department of public health, competence center, courts, state and federal police, ministry of social affairs, ministry of the interior, local rescue service organizations, etc.)

Summary:

Global infectious diseases will threaten the population in various ways.

Due to international air transportation, we must assume that the first patients will arrive at European airports within 14-48 hours.

This assessment becomes more foreboding when one considers that in Europe, for example, in Frankfurt, London, Paris, 50% of the passengers are so-called transit passengers and fly to other European destinations within a few hours.

The necessary measures of an entry/exit screening must be implemented with perceptiveness (toolbox) according to the local experts in close coordination with the airport owner/operators and must not be “triggered” by the media or politicians.

Taking into consideration the experience gained in Asia with the various methods of temperature measurement as well as the experience in Frankfurt with the plague with medical personnel direct onsite in the aircraft that are to be screened, in the author’s opinion, only the following alternatives can be discussed pragmatically:

1. Screening by a physician on board or the like (Entry Screening)
2. Screening by medical assistants at the gate finger (backup system by physicians centrally in the terminal)
3. Combination of both of the aforementioned measures

When it comes to distribution and screening of the so-called locator cards when entering/exiting an airport, the outlay appears to be entirely disproportionate to the benefits.

Only tight knit national and international networking (WHO, EU, CDC, ECAC, ACI, ADV ……) of experts on the part of the authorities and industry can ensure that joint efforts to preserve the heath of the population are facilitated.

It is imperative that the authorities make clear, unequivocal statements regarding competencies, responsibilities, and expenses in advance, so that it is possible to reach binding agreements on coordinated procedures with all “key players” (airport representatives, airlines, caterers, state and federal police, customers, department of public health, competence center, ministry of the interior, ministry of social affairs, and many others).

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