Current situation of anthrax in Human

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Anthrax

- Anthrax is primarily a **disease of herbivorous mammals**.
- The anthrax is locally known as '**Torka**'.
- Human Anthrax is a serious infectious disease caused by gram-positive, rod-shaped bacteria known as *Bacillus anthracis* and is an **anthropozoonotic infectio*n***.
- Toxins play a major role in its pathogenicity for both invasive and **toxicogenic infection pathways**.

- Human generally acquire the disease **directly or indirectly from infected animals or occupational exposure** to infected or contaminated animal products.

- **Control in livestock** is therefore the key to reduced incidence.

- The spores are able to naturally in soil survive in harsh conditions and can **remain dormant for years or even decades** until they find their way into a host.

CLINICAL PRESENTATION

Cutaneous anthrax

https://www.cdc.gov/anthrax/basics/types/cutaneous.html

- Incubation: **1–7 days** after exposure, but incubations as long as 17 days have been reported.

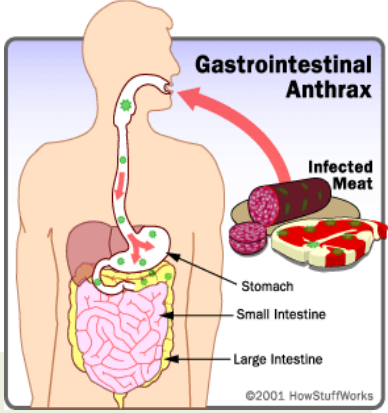
- Characterized by **localized itching** followed by the development of a painless papule, which turns **vesicular and enlarges, ulcerates, and develops into a depressed black eschar within 7–10 days of the initial lesion**. Edema usually surrounds the lesion, sometimes with secondary vesicles, hyperemia, and regional lymphadenopathy

- The head, neck, forearms, and hands are the most commonly affected sites.

- Patients may have malaise and headache; about a third are febrile.

CLINICAL PRESENTATION

Gastrointestinal anthrax



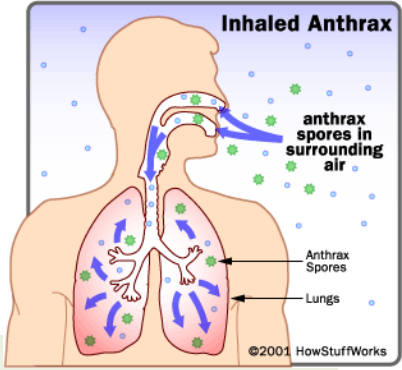
- Incubation: usually develops 1–7 days however, as long as 16 days have been reported.
- More than half of cases die if untreated; with treatment, the case-fatality ratio is <40%.
- There are 2 main types,
  - The Oropharyngeal type
  - Intestinal type

- **Fever and chills**
- **Swelling of neck or neck glands**
- **Sore throat**
- **Painful swallowing**
- **Hoarseness**
- **Nausea and vomiting, especially bloody vomiting**
- **Diarrhea or bloody diarrhea**
- **Headache**
- **Flushing (red face) and red eyes**
- **Stomach pain**
- **Fainting**
- **Swelling of abdomen (stomach)**

https://www.cdc.gov/anthrax/basics/types/gastrointestinal.html

CLINICAL PRESENTATION

Inhalation anthrax



- **Incubation: usually 1–7 days after exposure, but may be prolonged (up to 2 months).**
- **Fatality ratios have been 45%.**
- **Initially, making inhalation anthrax difficult to distinguish from influenza and community-acquired pneumonia.**
- **Upper respiratory tract symptoms occur in only a quarter of patients, and myalgias are rare.**

- Fever and chills
- Chest Discomfort
- Shortness of breath
- Confusion or dizziness
- Cough
- Nausea, vomiting, or stomach pains
- Headache
- Sweats (often drenching)
- Extreme tiredness
- Body aches

CLINICAL PRESENTATION

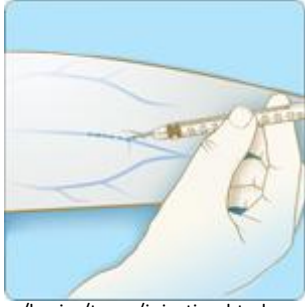
Anthrax meningitis

- Anthrax meningitis may develop from hematogenous spread of any of the clinical forms of anthrax, or it may occur alone;

- **half of all reported cases are sequelae of cutaneous anthrax**.

- Although anthrax meningitis is usually fatal, survival is significantly more likely if the patient receives multiple antimicrobials that include a bactericidal agent.

Injection Anthrax



https://www.cdc.gov/anthrax/basics/types/injection.html

- Recently, another type of anthrax infection has been identified in **heroin-injecting drug** users in northern Europe.

- Symptoms may be similar to those of cutaneous anthrax, but there may be infection deep under the skin or in the muscle where the drug was injected.

- Injection anthrax can spread throughout the body faster and be harder to recognize and treat.

Anthrax in Bangladesh

- **Anthrax was reported from 1980 to 1984 affecting both cattle and man.**
- **The animal anthrax, locally known as 'Torka', enzootic in Bangladesh**
- **A larger anthrax outbreak in 2009-2010, created a mass panic and socieo-economic impact.**
- **Passive surveillance system of DLS reported 5,937 cases of animal anthrax between years 2010-2012.**

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➢ **Human Cases are mostly occurring in**

- Pabna
- Sirajganj
- Tangail
- Meherpur,
- Rajshahi
- Kushtia

➢ *Most of the animal anthrax cases are reported from* ***Sirajgonj, Thakurgaon, Naogaon Bagerhat, and Brahmanbaria*** *districts through passive surveillance of DLS.*

Number of suspected anthrax cases in Bangladesh in 2010-18

Affected Districts	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Pabna	69	32	0	0	0	0	0	23		**124**
Shirajganj	219	65	74	23	42	0	182	0	03	**426**
Kushtia	49	0	5	0	0	13	8	0	0	**54**
Tangail	26	29	14	77	26	0	21	0	0	**172**
Rajbari	0	0	0	0	0	0	0	06	0	**06**
Meherpur	82	53	67	187	149	167	241	281	265	**538**
Manikganj	8	0	0	0	0	0	0	0	0	**8**
Shatkhira	1	0	0	0	0	0	0	0	0	**1**
Lalmonirhat	107	0	0	0	0	0	0	0	0	**107**
Rajshahi	8	21	0	0	0	7	17	0	0	**29**
Narayanganj	12	0	0	0	8	2	0	0	0	**20**
Laxsmipur	25	0	0	0	0	0	0	0	0	**25**
Chittagong	1	0	0	0	0	0	0	0	0	**1**
Bogra	0	40	16	0	0	0	0	0	0	**56**
Chapai Nawabganj	38	0	0	0	0	0	0	0	0	**38**
Chuadanga	0	0	0	40	0	0	0	0	0	**40**
Total Suspected	**645**	**240**	**176**	**327**	**225**	**189**	**469**	**310**	**268**	**2271**

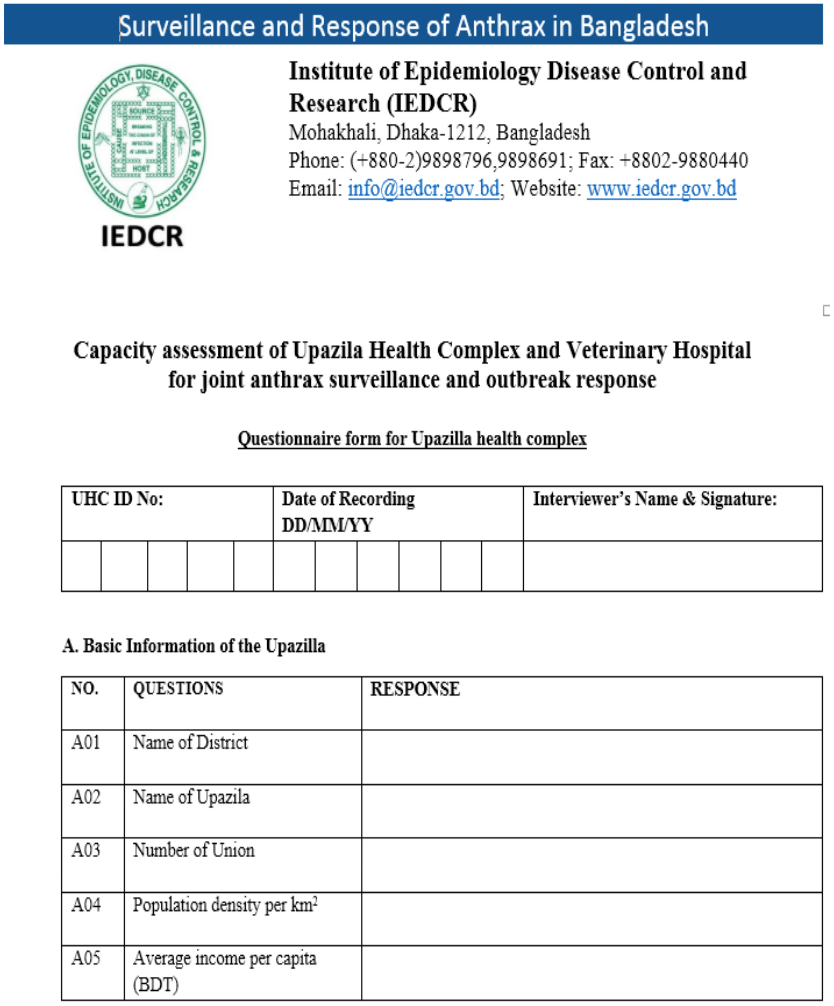
Need for Active Surveillance

Considering all those data and information, IEDCR had planned to start an active surveillance system for early detection of anthrax suspected cases from the community and to establish a molecular laboratory testing at IEDCR for confirmation of suspected cases

Sites assessment visit

Sites assessment visit

- Civil surgeon office of Sirajganj
- District livestock office of Sirajganj
- Field Disease Investigation Laboratory (FDIL) Sirajganj
- Upazila Health Complex , Ullapara, Sirajganj
- Upazila Health Complex, Kamarkhand, Sirajganj
- Upazila Health Complex, Shahjadpur , Sirajganj
- Civil surgeon office Meherpur
- District livestock office Meherpur
- Upazila Health Complex, Gangni , Meherpur
- Civil Surgeon office Pabna
- Upzila Health Complex, Santhia and Faridpur, Pabna



Surveillance and Response of Anthrax in Bangladesh

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IEDCR

Capacity assessment of Upazila Health Complex and Veterinary Hospital for joint anthrax surveillance and outbreak response

Questionnaire form for Upazilla health complex

UHC ID No:	Date of Recording DD/MM/YY	Interviewer's Name & Signature:

A. Basic Information of the Upazilla

NO.	QUESTIONS	RESPONSE
A01	Name of District	
A02	Name of Upazila	
A03	Number of Union	
A04	Population density per km^2	
A05	Average income per capita (BDT)	

Fig: Capacity assessment tools

Sites assessment visit

- Basic Information of the Upazilla
- Core Capacities of Surveillance Abilities
- Core Capacities of data recording and reporting
- Laboratory capacity assessment
- Core Capacities of Outbreak Investigation
- One Health Capacity assessment

Site selection

SURVEILLANCE SITES

Surveillance sites:

- 9 Upzila from 5 districts are selected based on the findings of capacity assessment report. Sites are as below:
  - **Sirajgonj (Shahjadpur, Khamarkhond, Belkuchi, Ullapara)**
  - **Pabna (Faridppur, Sathia**)
  - **Meherpur (Gangni)**
  - **Rajshahi (Godagari)**
  - **Tangail (Gopalpur)**

Anthrax Surveillance Protocol Development

- Protocol and SOPs for sample collection, processing, and transport were being developed by attending series of meetings internally (anthrax surveillance team of IEDCR) and then shared with team from BSPB, US CDC.

- The recommendations were incorporated before finalization of Surveillance protocol and SOPs

- This protocol and SOPs were shared with DLS

- The SOPs are being distributed to sites

SOP development

- Series of meeting with lab experts from IEDCR developed the SOPs for sample collection, processing, storage and transportation to IEDCR from suspected anthrax human cases

Training on Sample collection

- Medical technologists from each sites were being trained at IEDCR microbiology laboratory on sample collection, processing, storage and transportation following the SOPs prepared for the purpose

- Laboratory specialist were being involved to accomplish the training

- MTs were trained on waste disposal too specially waste originated during sample collection from suspected anthrax cases

Site orientation and surveillance initiation

- Site orientation was done in 2018

- March 2018 – Gangni from Meherpur
- April 2018 – Shahzadpur, Ullahpara, Belkuchi, Kamarkhond from Sirajgonj
- May 2018- Sathia, Faridpur from Pabna
- June 2018 – Gopalpur, Tangail
- Janurary 2019- Godagari, Rajshahi

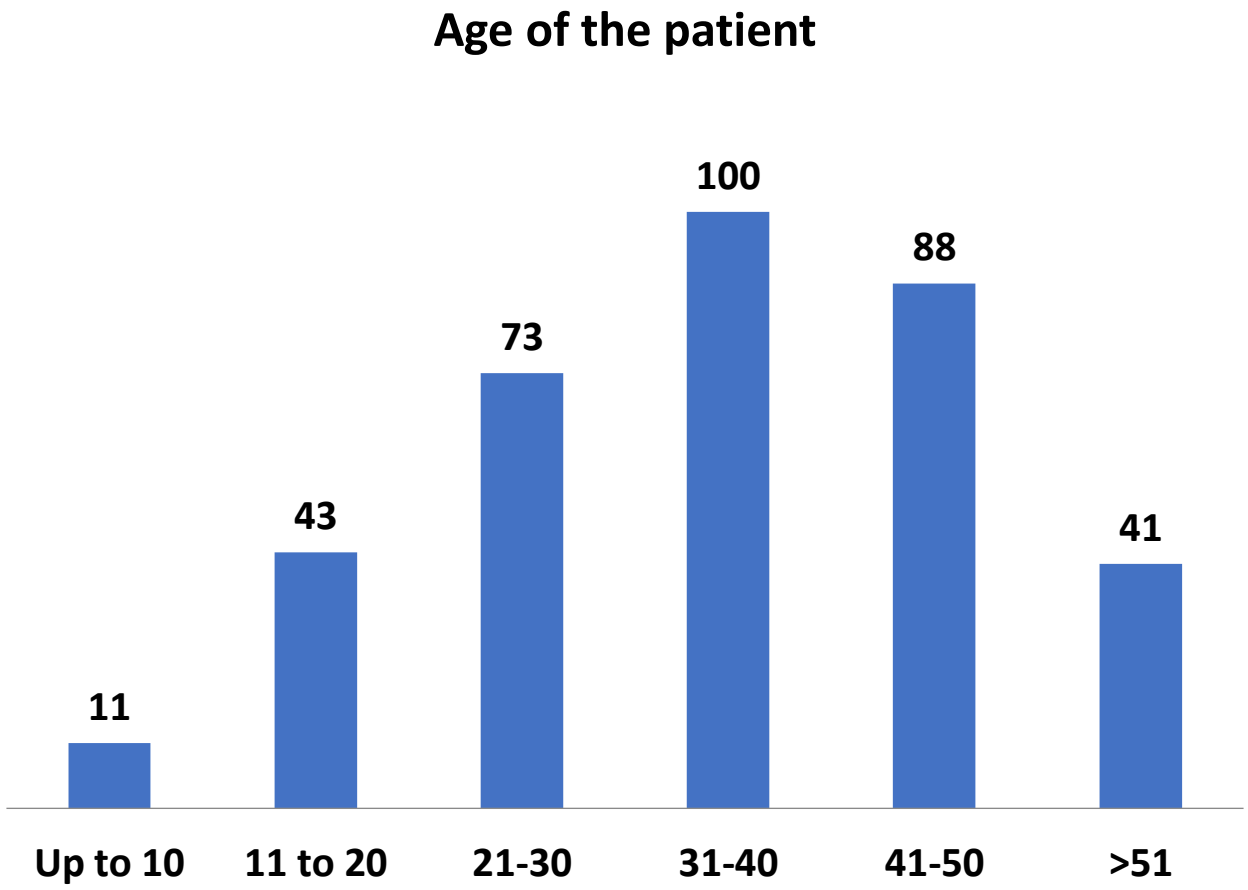
Suspected anthrax cases from sites

- From 9 sentinel sites regular cases reported from Gangni Upzila, Meherpur
- 8 cases came from Shahzadpur upzila, Sirajgonj
- No case reported from other 7 sites

Analysis of samples

GENDER	Frequency	Percent
Male	166	47.16%
Female	186	52.84%
Total	352	100.00%

Income		
Up to 10000	209	
10001-20000	144	
> 200000	38	


Age of the patient
11
43
73
100
88
41
Up to 10
11 to 20
21-30
31-40
41-50
>51

Occupation

Poultry worker	4	1.21%
Others	6	1.82%
Butcher	7	2.12%
Day labourer	7	2.12%
Service holder	7	2.12%
Business	21	6.36%
Student	38	11.52%
Farmer	84	25.45%
House wife	156	47.27%

Union	Number
Katholi	14
Shaharbari	24
Sholotaka	33
Raipur	39
Motmura	52
Dhankhola	60
Tetulbaria	62
Bamundi	65
Pauroshova/Gangni	111
Kazipur	136

Reason behind for skin infection	Frequency
Slaughtering sick goat	31
Slaughtering sick cow	39
Processing infected cow meat	46
Processing infected goat meat	33
Coocking infected cow meat	28
Coocking infected goat meat	22
Coocking infected meat	15
Eating cow meat bought from market	12
Eating goat meat bought from market	9
Don't know	55

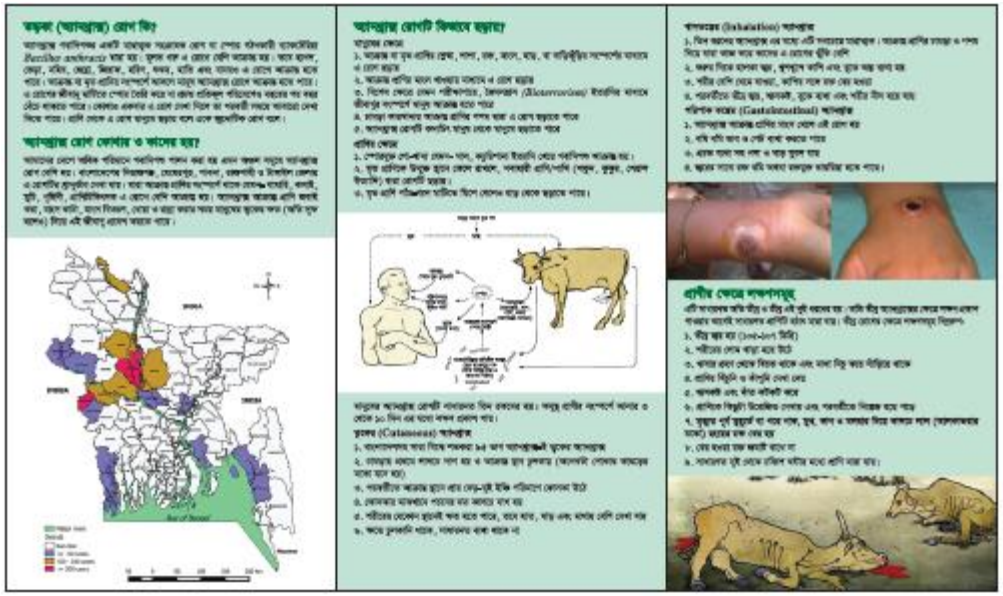
Test result	
Sample tested	**158**
Test positive	**9**
From Gangni	**7**
Shahazadpur	**2**
Year 2018/Gangni	**5**
Year 2019/Gangni	**2**

Samples	**No**	**Culture positive**	**PCR Positive**	
Year 2018/Gangni	**5**	**Yes**	**Yes**	
Year 2019/Gangni	**2**	**No**	**Yes**	

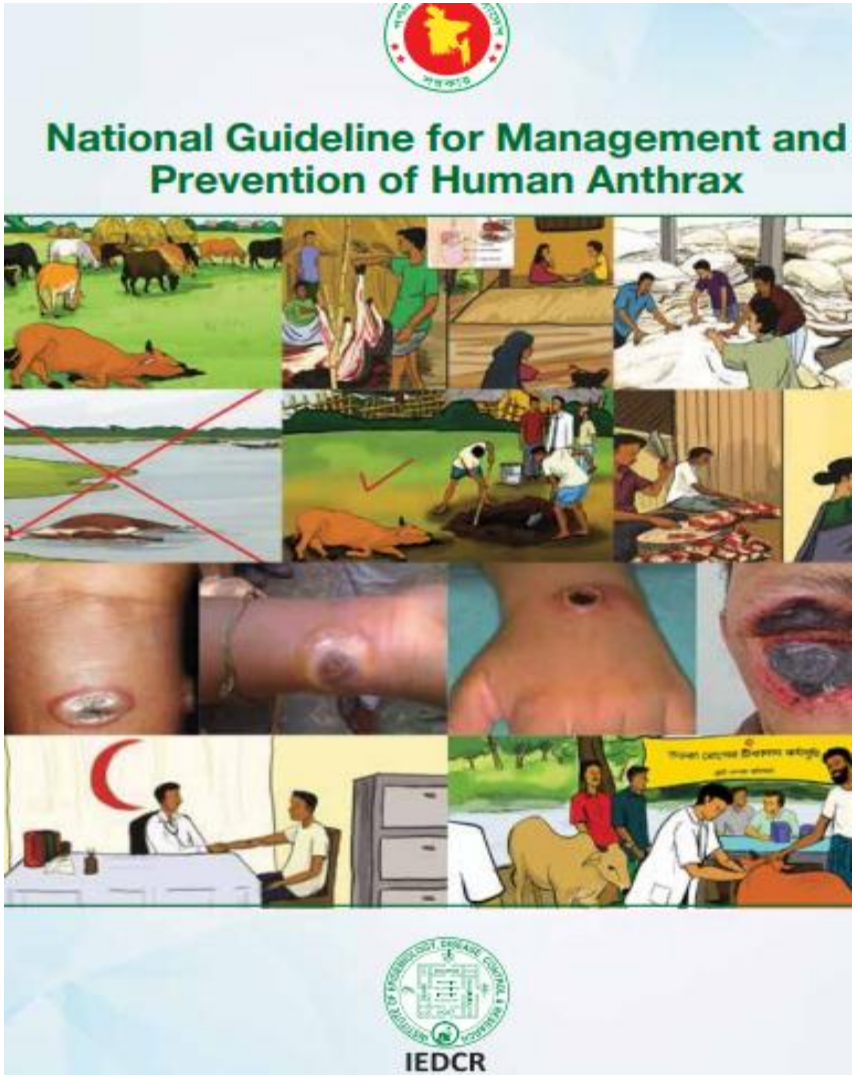
Preparation for Community Awareness

- Development of IEC materials
- We have prepared Poster

Tri fold brochure/ leaflet



Anthrax Management Guideline



Challenges

- A big challenge is to get appropriate sample for confirmation at laboratory

- Sample collection, preservation and transport is also sometimes very challenging

Achievement

- Established an advance molecular testing for confirmation of anthrax cases at IEDCR
- To enhance culture method for anthrax diagnosis
- Get some laboratory confirm cases from surveillance sites

Way Forward

Start intervention at Gangni upzila of Meherpur, the potential site for regular source of human suspected anthrax cases

THANK YOU