WEEKLY EPIDEMIOLOGICAL REPORT

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Historical Perspectives in Epidemiology: Panum's 1846 Measles study and its impact on Modern Epidemiology - Part I

This is the first article of two in a series on "Historical Perspectives in Epidemiology: Panum's 1846 Measles study and its impact on Modern Epidemiology"

A major historical question in the development of public health has been "What causes epidemic outbreaks of disease?"

The field of epidemiology emerged in a period where epidemic outbreaks were largely attributed to 'miasmas'. Until an English physician by the name of **John Snow** came along and identified the source of a cholera outbreak in 1854 in London, due to contaminated water from a specific local street pump. This was at a time when most medical personnel and scientists considered the main causative factor as 'miasma' or bad air quality caused by decaying organic matter, and made ill, those who inhaled it.

However, one of the major figures in shifting the focus of epidemiology from the miasma theory to the contagion theory was a Danish physician by the name of **Dr Peter Ludvig Panum**. The contagion theory refers to the process by which infections are transmitted from one person to another. Dr Panum's landmark research was conducted during a measles outbreak in the isolated Faroe Islands of Denmark and resulted in promoting the scientific revolution of the germ theory of disease. The Faroe Islands consist of 17 inhabited islands, the largest of which is about 8 square miles. The islands are characterized by a rugged terrain with cliffs, rolling hills and narrow fjords (long, deep, narrow inlet of the sea between high cliffs) with a climate ranging from cool summers, mild winters and frequent fog and rain.

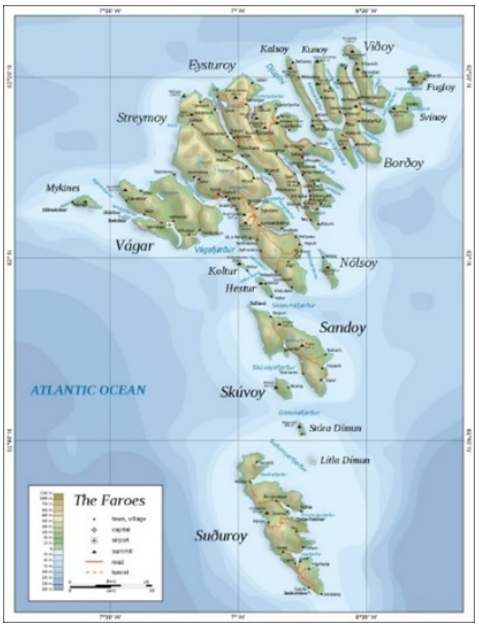

Figure 1: Map depicting the Faroe Islands

Contents **Page**

1. Historical Perspectives in Epidemiology: Panum's 1846 Measles study and its impact on Modern Epidemiology - Part I 1
2. Summary of selected notifiable diseases reported (27th – 03rd May 2024) 3
3. Surveillance of vaccine preventable diseases & AFP (27th – 03rd May 2024) 4

Figure 2: Picturesque view of the Faroe Islands

The Danish government and monarchy placed large importance on the public health of their population for both economic and military reasons. When an epidemic of measles affected the previously unexposed population of the Faroe Islands in 1845-46, the Danish government decided to send a physician by the name of Peter Panum to the Faroe Islands to attempt to control the epidemic.

In 1846, there were over 7800 individuals living on the Faroe Islands. Of these, around 6100 contracted measles and around 170 died (case fatality ratio: 2.8%). Dr Panum treated over 1000 of these affected patients. The key to Panum's investigation was the isolated nature of the village settlements on the Faroe Islands. Individual villages were set apart from each other on a number of long, narrow islands (Figure 1). Thus, each village had a mini-epidemic of its own. Over 52 isolated villages were identified by Panum including the index case in each of them. The time between the first case in each village and the subsequent cases in each village was meticulously noted by Panum. Dr Panum also wrote in detail about the environment of the Faroe Islands which is well documented in his written work on the measles epidemic.

To understand the epidemiology of how diseases such as measles spread, it is important to also comprehend the characteristics of the population and the environment. The Faroe Islands, although part of the Danish kingdom, since 1837, were inhabited primarily by people of Norwegian descent. Their diet, lifestyle, clothing, housing, lack of sanitation, high rate of mental illness and lack of physicians and midwives were considerably lower than the established norm for Denmark at the time. Their diet consisted mainly of wind-dried meats, they wore the same clothing in both winter and summer, and most of the population was lice-ridden. Dr Panum had also written detailed accounts regarding common illnesses faced by the Faroese, their health habits, how they lived, and the climate. The inhabitants also were observed by Panum to be intelligent and observant in their day-to-day activities. This was seen mostly in their concept of a **folk quarantine** among themselves during the measles epidemic in 1846.

The last known measles epidemic in the Faroe Islands had taken place in 1781 (almost 70 years ago). This prior experience with measles taught some of the elderly population that the spread of measles could be hindered by isolating places or even houses. Thus, on their responsibility, a sort of quarantine was implemented resulting in about 1500 inhabitants being spared of contracting the disease. .

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2. Melgaard, Craig A. and Golbeck, Amanda L. (2014) "Peter Ludwig Panum and the Danish School of Epidemiology," *The Bridge:* Vol. 37: No. 2, Article 7. https://scholarsarchive.byu.edu/thebridge/vol37/iss2/7

3. https://blogs.cdc.gov/publichealthmatters/2017/03/a-legacy-of-disease-detectives/

To be continued...

Table 1: Selected notifiable diseases reported by Medical Officers of Health 27th – 03rd May 2024 (18th Week)

RDHS	Dengue Fever		Dysentery		Encephalitis		En. Fever		F. Poisoning		Leptospirosis		Typhus F.		Viral Hep.		H. Rabiies		Chickenpox		Meningitis		Leishmania-		Tuberculosis		WRCD	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	114	4551	0	8	0	4	1	28	0	5	8	164	0	8	0	5	0	0	13	185	0	12	0	0	37	748	84	100
Gampaha	48	1971	1	10	0	6	0	5	0	2	17	245	0	3	0	1	0	0	8	118	4	43	0	8	27	427	86	99
Kalutara	41	1310	1	15	0	1	1	22	1	12	6	267	0	5	0	6	0	0	15	268	0	26	0	0	0	215	93	100
Kandy	66	1811	1	8	0	0	1	6	6	9	2	100	0	11	0	4	0	0	14	218	3	9	1	18	0	231	100	100
Matale	6	342	1	2	0	0	1	2	9	17	0	43	0	1	0	4	0	0	14	50	0	6	5	103	0	48	100	100
Nuwara Eliya	3	186	6	36	1	4	1	4	3	137	6	84	0	24	0	3	0	0	6	91	0	3	0	0	11	109	100	100
Galle	24	1077	0	19	1	9	0	5	2	29	4	294	0	47	0	5	0	1	17	260	1	32	0	3	7	157	100	100
Hambantota	15	487	4	16	0	1	0	3	0	33	6	258	1	18	0	2	0	0	6	126	1	14	8	186	0	38	100	100
Matara	14	398	0	4	0	3	0	2	0	4	7	137	0	9	0	2	0	0	9	143	0	38	0	38	1	45	100	100
Jaffna	28	4949	2	29	0	1	0	4	0	22	0	12	0	357	0	3	0	1	4	116	1	7	0	0	27	103	92	93
Kilinochchi	0	268	0	5	0	0	0	2	0	2	2	15	0	7	0	0	0	0	1	5	0	4	0	0	0	8	100	100
Mannar	1	183	0	0	0	0	0	1	0	0	0	16	0	6	0	1	0	0	0	4	0	3	0	1	0	23	100	100
Vavuniya	0	125	0	0	0	0	1	1	0	7	1	56	0	2	0	4	0	0	0	15	1	7	1	6	1	11	75	100
Mullaitivu	2	179	0	4	0	0	0	0	0	2	3	53	0	10	0	0	0	0	0	2	0	0	0	5	0	13	83	100
Batticaloa	17	1056	0	58	0	6	0	4	4	16	1	32	0	1	0	8	0	0	1	49	0	22	0	1	1	53	100	100
Ampara	3	147	0	14	0	2	0	0	4	12	6	123	0	1	1	4	0	0	2	55	1	21	0	6	0	71	71	100
Trincomalee	19	450	0	10	0	0	0	2	0	1	9	104	1	10	0	0	0	0	1	27	3	7	0	8	2	30	100	100
Kurunegala	19	1262	1	15	2	15	0	1	0	341	15	279	1	16	0	2	0	2	14	196	9	115	10	215	5	192	100	100
Puttalam	7	634	0	1	0	1	0	3	0	0	2	128	0	5	0	1	0	0	1	59	2	27	0	11	9	72	85	100
Anuradhapura	4	481	0	4	0	2	0	0	0	4	9	215	1	24	0	6	0	0	6	93	0	20	15	323	4	96	96	100
Polonnaruwa	7	197	1	12	0	0	0	1	0	2	5	133	0	1	0	2	0	0	4	70	1	15	18	187	5	39	100	100
Badulla	7	505	0	11	0	4	0	0	1	20	5	232	2	13	0	10	0	0	17	132	1	13	1	12	4	78	86	100
Monaragala	7	394	0	5	1	2	0	1	0	68	4	439	1	17	0	12	0	0	2	51	3	49	7	92	0	31	82	100
Ratnapura	74	1081	2	44	0	3	0	3	0	7	43	681	1	11	0	12	0	2	7	131	3	53	6	75	17	122	95	100
Kegalle	36	1034	0	5	0	4	0	5	0	4	11	248	1	9	0	5	1	1	26	323	1	26	2	14	13	122	100	100
Kalmunai	9	521	1	10	0	0	0	0	0	5	1	40	0	1	0	1	0	0	4	87	0	7	0	0	1	50	83	100
SRILANKA	**571**	**25599**	**21**	**345**	**5**	**68**	**6**	**105**	**30**	**761**	**173**	**4398**	**9**	**617**	**1**	**103**	**1**	**7**	**192**	**2874**	**35**	**579**	**74**	**1312**	**172**	**3132**	**93**	**99**

Source: Weekly Returns of Communicable Diseases (esurvillance.epid.gov.lk). T=Timeliness refers to returns received on or before 03rd May, 2024 Total number of reporting units 358 Number of reporting units data provided for the current week: 357 **C****-Completeness *

A = Cases reported during the current week. B = Cumulative cases for the year.

Table 2: Vaccine-Preventable Diseases & AFP

27th – 03rd May 2024 (18th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2024	Number of cases during same week in 2023	Total number of cases to date in 2024	Total number of cases to date in 2023	Difference between the number of cases to date in 2024 & 2023
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	01	00	00	00	00	01	00	00	02	02	30	29	3.4 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	01	00	02	01	00	02	01	01	01	09	02	102	77	32.4 %
Measles	00	00	00	00	01	00	00	00	00	01	00	202	00	0 %
Rubella	00	00	00	00	00	00	00	00	00	00	00	01	01	0 %
CRS**	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Tetanus	00	00	00	00	00	00	00	00	00	00	00	02	01	100 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Japanese Enceph-alitis	00	00	00	00	00	00	00	00	00	00	00	01	02	-50 %
Whooping Cough	01	00	00	00	01	00	00	00	00	02	00	06	03	100 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

NA = Not Available

Take prophylaxis medications for leptospirosis during the paddy cultivation and harvesting seasons.

It is provided free by the MOH office / Public Health Inspectors.

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