

To most of you - believe fair to say - smallpox is but one of a series of <sup>SPV</sup> exotic diseases confined to developing countries in the tropics - few in the USA have seen cases and most expect they never will (last case USA - 1949)

Curiously, in many of the <sup>endemic</sup> developing countries, smallpox is a comparatively small problem numerically and ~~does not rank in importance to~~ <sup>is sometimes</sup> ~~be~~ considered to be a <sup>lesser</sup> ~~comparatively small~~ problem compared to perhaps tuberculosis, leprosy, cholera.

Before discussing with you certain of the aspects of the present erad. prog. and a bit on the clinical aspects of the disease smallpox, I ~~should like to place the disease in perspective for~~ <sup>I believe we should first put</sup> ~~view the problem of smallpox in perspective for~~ <sup>I believe the</sup> only by so doing can ~~it be understood~~ <sup>the right nature of this</sup> it be understood why the concern and attention focused on this one disease.

~~Smallpox has been and is by far the most lethal~~

~~However viewed, smallpox represents stands alone as the~~

Of all diseases known to mankind, none combines the potential for spread with the high mortality rate observed in variola major. There is no natural immunity to the disease; there are no geographic barriers - the smallpox can spread quite easily in the arctic as in the tropics; the <sup>case-fatality</sup> mortality rate among the unvaccinated is 40% or greater - there is no effective therapy whatsoever. And it should be noted that this 40% fatality rate is not confined to patients in developing countries. In 1962-1963, outbreaks occurred in UK and Sweden - in these countries, with the best of medical care, 40% of the unvaccinated died. ~~Tuberculosis, leprosy, cholera, typhoid comparatively~~ <sup>are more head colds</sup> ~~compared to smallpox.~~ <sup>when compared to smallpox.</sup>

In 18<sup>th</sup> century, variolation was int. <sup>to Europe</sup> ~~consisted of~~ <sup>scraping</sup> ~~with virus~~ <sup>with virus</sup>. Dangerous procedure. Fear of this disease, however, still dictated

Variably 1 to 5% died. Widely practiced + hailed, however, as a step forward. Can you imagine a <sup>vaccination</sup> procedure today with a 1-5% mortality rate. Comparatively leprosy, tuberculosis, cholera, etc. are mere head colds.

Actually

far beyond others

This disease <sup>and is</sup> has been the cause of concern to every country. Consider -

Every country demands <sup>that international travellers carry</sup> a vaccination certificate - it is the only disease for which this requirement is invoked by all countries

Vaccination programs are carried out <sup>more or less intensively in</sup> ~~to greater or lesser degrees~~ every country throughout the world - between 500 million and a billion vaccinations are performed annually - in the U.S., about 15 million vaccinations are performed <sup>each year</sup> ~~annually~~ - on a world wide basis, I would guess that <sup>smallpox</sup> vaccination ~~against smallpox~~ <sup>is</sup> at least 100 times more frequently performed than any other vaccination.

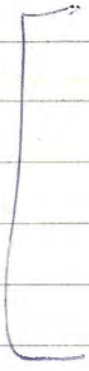
Introduction of a <sup>single</sup> case into a non-endemic area is regarded as a major emergency problem.

Germany - total isolation of case and physicians

U.K. - for 70 odd cases in 1962 - \$4 million £ (\$US 10 million) was spent.

Isolation hospitals.

Is this warranted?



~~Time and containing~~  
vaccination

In 1798, Jenner ~~discovered~~ <sup>performed</sup> the procedure of scarification with Milk maids - cowpox - vaccination

Increasingly widely used and gradually smallpox began to recede.

1850 - Europe, North America free

1960 - Central America, North Africa

1967 - Middle East, ~~SE Asia~~ Western Pacific

27 countries endemic. In these, disease reduced to comparatively <sup>modest</sup> ~~low~~ levels.

WHO <sup>activity</sup> 127 countries like-UN considered problem carefully.

1966 voted a budget of \$2.5 million for global eradication. Requested additional voluntary <sup>contributions</sup> support. Pointing out - smallpox is much of a problem to endemic as non-endemic countries. WHO for example spends at least \$20 million per year protecting itself vs. a disease which hasn't occurred since 1949.

Question of whether global eradication was possible was carefully explored - felt that it definitely was - at this stage, in fact, it is probably the only disease for which this possibility exists.

Characteristics:

1. Man to man - no insect or other reservoir (unlike; yellow fever)
2. Infectious - beginning of rash to last scabs - no chronic carriers (unlike)
3. No subclinical cases. (polio)
4. Spread fairly slowly (vs. flu or measles)  
Incubation period  
Close contact
5. Vaccine is highly effective  
3 yrs. total ~~but~~ perhaps 20 yrs. or longer  
80-95% cases - no vaccination scars.

1967 Commencement of program <sup>10 yr.</sup> Organization WHO HQ - Field 60 WHO staff (multiple network) Countries - ~100,000 vaccinators.

USA effort - West Africa

WHO effort - other countries (describe)  
Cost \$3.0 million WHO budget + ~\$6 million other countries (USA + USSR) + ~\$20 million <sup>other countries</sup> endemic countries

Progress - ~~graph~~ <sup>Overall</sup> ~40% decline the second year.  
West Africa.

Special devices assisting encouraging.

1. Freeze-dried vaccine - characteristics.

70 labs. - 46 countries - WHO assisting.

2. Bifurcated needle

3. Jet injectors.

~~4. Surveillance~~

Word about disease itself -

So much for the global & a word about the clinical.

The first case of smallpox into this matter of time.

Classical -

Person vac. with important vaccine (U.S. traveler) enters <sup>in good health</sup> perfectly with proper certificate. Develops disease. Prev. vac., diag used as chickenpox.

Infects several others in household.

<sup>two weeks before</sup>

One enters hosp. with purpuric disease and disease - dx ITP.

Second <sup>(perhaps adult)</sup> " severe chickenpox <sup>+ dies</sup> - teaching case.

Third dx as herpes  $\bar{p}$  multiple trips thru dermatological clinics.

Suddenly - three more cases <sup>severe</sup> of cpox in hospital ward and an interne says they don't look like textbook pictures. Consultants are called in (physicians who saw smallpox in U.S. 30 yrs. ago - decision of opinion) Patient hasn't been out of U.S. - how could he?

Call to Health Dept - to NCDC - man flies up same day + smallpox.

Fiction - no! - Sweden in 1963 - 1<sup>st</sup> cases in 30 yrs. Setting - principle teaching hosp.

In each instance - spread in hospitals - 2/3.

MD, laundry personnel, visitors, patients, family members.

A word about clinical char. may be helpful. - pictures from outbreak in U.K. - 1962.

of variola minor - U.K. - 1966. Variola minor - Brazil + <sup>some parts</sup> Africa. - appearance identical to variola major but pt. less ~~severe~~ toxic, hemorrhagic forms are rarer

mortality about 1 to 2%.

had been v.d. - variola minor.

Onset abrupt - fever?

prodrome - like influenza -  
fever, aching, pain in back

After 2-4 days - rash.

Develops in 1-2 days beginning with face and spreading toward feet.

Centrifugal in distribution

often on palms + soles

SLIDE 1

S - 6<sup>th</sup> day

S 2-3

7-8

(may see this in <sup>some vesicles</sup> PC pox but lesions more extensive on trunk) S-4<sup>9</sup>

lesions are first macular, rapidly becoming vesicular, sometimes surrounded by red flare

3<sup>rd</sup> day

S-10<sup>10</sup>

all lesions similar

4<sup>th</sup> day

S-6<sup>11</sup>

6<sup>th</sup> day

S-7<sup>12</sup>

umbilication

8<sup>th</sup> day

S-8<sup>13</sup>

erythema confluent, skin oedematous, lesions painful

10<sup>th</sup> day

S-9<sup>14</sup>

oedema subsiding as well as fever

12<sup>th</sup> day

S-10<sup>15</sup>

Not much change

14<sup>th</sup> day

S-11<sup>16</sup>

Scabbing is taking place

S-12<sup>17</sup>

Scabs separating

lesions normally occur in the mouth - transmission S-13<sup>20</sup>

Other patients:

S-14<sup>22</sup>

5<sup>th</sup> day

S-15<sup>23</sup>

Same patient - legs.

S-16<sup>25</sup>

Note - clustering around ankle

S-17<sup>26</sup>

3<sup>rd</sup> day - less easy to dx than later

S-18<sup>27</sup>

5<sup>th</sup> day

S-19<sup>29</sup>

Lesions on the palate

S-20<sup>30</sup>

Lesion on the tongue

S-21<sup>31</sup>

More evident now

To other diseases

S-22<sup>39</sup>

Chickenpox - lesions superficial, different stages, etc.

S-23<sup>40</sup>

Contract with varicella

S-24<sup>41</sup>

Eczema vaccinatum -

rash distribution.

Should the disease come to Cleveland - perhaps recognition may be less of a problem. But - should the disease come - trust your ~~with~~ hospital staffs will be adequately vaccinated.

However, I hope to make your job easier by the more direct approach of eradicating this disease in its endemic locus. We hope we are successful. On the 2<sup>nd</sup> year of the 10 year program, prospects look bright. If achieved, this truly will ~~make a~~ be a distinctive milestone in international cooperation <sup>and</sup> in preventive medicine.