more than 1-3 years. This minority should not be a hazard to a community where re-vaccination is being carried out at approximately 5-yearly intervals, provided over 80 per cent. of the susceptible infant population have been vaccinated and a correspondingly high proportion are being re-vaccinated.

Assessment of clinical protection will depend on satisfactory arrangements for the ascertainment and recording of all cases of all degrees of severity. It is also important, if outbreaks are to be promptly controlled, that cases or suspected cases be reported as early as possible. Outbreaks often begin in overcrowded areas of a city or in isolated village communities where facilities for early recognition and reporting are poor. Again, the onus of notifying early cases in such communities will have to be undertaken by the local Panchayat Secretary or, in overcrowded (and often homeless) city communities, by a health visitor or a vaccinator or other official who is well acquainted with the community.

Laboratory diagnosis: Smallpox in a vaccinated person may sometimes not be easily diagnosed on clinical evidence and laboratory aid may be required. The laboratory diagnosis of smallpox can now be made quickly and accurately in the majority of cases provided the trained staff and facilities of a virus laboratory are available.

Four different methods may be used, preferably in combination, viz.: direct microscopy, agar gel diffusion precipitation, complement-fixation test, and virus isolation in the chick embryo (see table).

Direct microscopy is quick (30 minutes or so) and reliable, provided the specimens (smears on slides) are properly made from suitable lesions (i.e. papules or vesicles). This method will, if the above criteria are fulfilled, distinguish readily between smallpox and almost any other axanthem except generalized vaccinia. It requires experience before it becomes reliable.

The agar gel precipitin test has only recently been applied in smallpox diagnosis.[1] It is quick and convenient (readings in 2-5 hours) and does not require much skill and experience but for a satisfactory test an adequate sample of crusts or vesicle fluid is required.

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[1] Dumbell, K. R., Nizamuddin, Md. (1959) Lancet, 1, 916

The complement-fixation test for antigen in specimens is considerably more sensitive than the agar gel technique but it takes 18 hours before the results can be read. It can be carried out with a minimal amount of specimen and has been used for detecting antigen in the blood in the early stages of infection.

All positive specimens, as judged by the aforementioned tests, should be confirmed by virus isolation in the chick embryo, which is the only certain method for differentiating smallpox from generalized vaccinia. Results are available after 2-3 days' incubation.

Details of technical procedures for the laboratory diagnosis of smallpox are given in "Diagnostic Procedures for Virus and Rickettsial Diseases", American Public Health Association (2nd Edition, New York, 1956).

TABLE

LABORATORY TESTS IN DIAGNOSIS OF SMALLPOX

Stage of Illness	Material to be Submitted	Microscopic Examination of Smears from Skin Lesions	Culture on Chick Embryo Chorio-Allantois	Detection of Antigen by Complement-Fixation Test	Detection of Antibody*
Pre-eruptive illness	Blood		±	±	-
Macular and papular stage	Smears from skin lesions	+	+	±	
	Blood				-
Vesicular	Vesicle fluid	+	+	+	
	Smears	+	+	+	
	Blood				-
Pustular	Pustile fluid	±	+	+	
	Smears	+	+	+	
	Blood				±
Crusting stage	Crusts	-	+	+	
	Blood				+
Later	Blood				+
Time required for completion of test:		30 minutes	2-3 days	24 hours	24 hours

+ Test is usually positive

± Test may or may not be positive

- Test usually negative

* Antibody may appear earlier in patients with history of vaccination