



POLIO LAB NETWORK

Quarterly Update



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This is the final issue of UPDATE

When the first issue of UPDATE was published in the summer of 1995, the Polio Lab Network was still in its formative stages. A top priority was to ensure that all Network laboratories and others in the program were informed of program goals, current laboratory practices, and technological advances. Many laboratories did not have access to modern virology textbooks or relevant scientific journals. Mail and faxes were the most common forms of communications and some laboratories were still without dedicated telephones and fax machines. Where access to electronic communication existed in some laboratories, email messages were frequently required to go through designated gatekeepers. The UPDATE was created to fill the communications void.

Early issues of UPDATE were devoted to basic articles designed to ensure laboratories were “on the same page”, such as the rationale for collection and testing two stool samples rather than one, the case for testing single samples rather than pooling, the inadequacy of rectal swabs and anal tubes, and the duration of poliovirus shedding. Other articles focused on basic equipment and supplies for the national laboratory, especially the requirement for a liquid nitrogen cell bank. Effective integration of the laboratory and AFP field surveillance was a persistent theme.

By 1997, UPDATE articles began to reflect the evolution of the proficiency test into a comprehensive network-wide annual accreditation system, greatly facilitated by the provision of basic laboratory equipment to all laboratories through Rotary International. L20B cells were introduced in 1998 along with the new scheme for poliovirus isolation. The first discussion of genomic sequencing appeared in 1999 with subsequent tutorials on applications. The year 2000 volume described for the first time OPV-derived polioviruses. Laboratory containment articles began to appear as preparations for the post-eradication era began. By 2002, with the continued support of Rotary International, all national laboratories had computers, access to email and data management capabilities.

Throughout the years, the UPDATE published articles on evolving laboratory procedures, new policies, case studies, laboratory quality control (LQC) for cell sensitivity testing, environmental testing, reports from the Regions, steadily improving accreditation scores, and the challenges of unintended virus transfer, that is, laboratory contamination. As the Western Pacific Region (2000) and the European Region (2002) joined the polio-free ranks along with the Americas Region, emphasis and articles began to focus on the challenges in the endemic Regions of South East Asia, Africa, and Eastern Mediterranean. Network successes were celebrated with pride as these Regions met phenomenal increases in workloads with ever-improving performance levels.

Meanwhile, laboratories in the polio-free Regions were facing the challenge of sustaining health care provider interest in poliovirus surveillance. Laboratories, especially in EUR, were exploring advanced molecular methods for poliovirus laboratory diagnosis and expanding enterovirus capabilities, efforts crucial for design of the post-eradication laboratory network. The technical information needs of laboratories in the polio-free and polio-endemic Regions became increasingly diverse. That diversity came into even sharper focus with the lead article in the December 2006 issue that featured the new test algorithm to accelerate poliovirus identification in the polio-endemic regions.

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In the 12 years the UPDATE has been published, information needs have become more Region specific. Electronic communications from Geneva and the Regional Laboratory Coordinators have become the norm. Information of general interest to Network laboratories is frequently available in the *Weekly Epidemiologic Record*, *Polio News*, and the WHO polio website. The hardcopy UPDATE is no longer the primary source of communications. With concurrence of the Regional Laboratory Coordinators, we proudly conclude the UPDATE has achieved its goal.

With departure of UPDATE the Network is in good shape (see following report). But we cannot refrain, even in closing, from publishing the article on page 3 that mixes a little humor and a little preaching to hopefully make your laboratory experience a little better.

Volume XIII is dedicated to the many who have contributed directly and indirectly to the UPDATE success. It has been a pleasure to bring this service to you.

Keep in touch. *The editors*

The 2006 state of the Network

The Network of 145 laboratories supporting the global polio eradication initiative (PEI) continues its high level of performance. In 2006, 96% of all laboratories were fully accredited and 4 % were provisionally accredited based on annual (usually on site) WHO evaluation of performance, proficiency testing, timeliness and accuracy of results.

In 2006, Network laboratories tested ~135,000 faecal samples from AFP cases and ~9,000 non-AFP samples. Wild polioviruses (2,000) were isolated from AFP cases in 17 countries (see page 4). Vaccine derived polioviruses (VDPVs) were identified from AFP cases and contacts in four countries, sewage waters without evidence of paralysed persons in 2 countries, immunodeficient persons in 3 countries, and a healthy child in one country.

The Network suffered a serious setback in 2006 through a fire at the global specialized laboratory (GSL) in Mumbai, India. Two Network laboratories (Lucknow and Chennai, India) responded to the emergency by accepting over 10,000 faecal samples and 6,000 polio isolates redirected from Mumbai.

Sequencing was performed in Mumbai at a non-network laboratory that generously offered part-time access to its equipment. The Network is grateful for the financial support from partners to replace equipment at the GSL and the national resources mobilized to renovate the facility. The Mumbai polio laboratory has now re-opened and should become fully functional by mid-2007.

2006 also paved the way for implementation of the new test algorithm that reduces poliovirus confirmation time by 50% (from 42 to 21 days for completion of laboratory tests) without compromising poliovirus detection sensitivity (UPDATE, XII, 4, p1). Nine laboratories will be expected to establish ITD testing for the first time. The 2007 network goal is to use this new strategy to test at least 75% of faecal samples from polio endemic regions.

Case Study 4: Dr. Noplani receives an unexpected shipment

Dr. Noplani was hard at work reviewing the results of the previous day's PCR test run when Mr. Orderlo appeared in her office in a state of agitation. A representative of FastGo shipping company had just arrived in a large truck to deliver supplies. There was no refrigerator space for the 500 bottles of maintenance medium, no laboratory space for the chest type freezer, and no storeroom space for 1,000 cold boxes that FastGo's agent said he had on the truck. Dr. Noplani was sure there was some mistake. She did not recall ordering those supplies and FastGo's agent was definitely not expected that morning. Dr. Noplani accompanied Mr. Orderlo downstairs to talk to the agent, grabbing the orders file as she hurried out of the door. Much to Dr. Noplani's surprise, FastGo's paperwork appeared to be in order and there was some mention of those items in correspondence files from Mr. Franz of the All World Foundation, Unit for Laboratory Support (AWFULS). Dr. Noplani had no choice. She accepted delivery and phoned Mr. Franz to find out why his generosity had been so excessive.

Mr. Franz appeared to be in a bad mood, in fact, irritable. He told Dr. Noplani that he had sent numerous emails to the laboratory some months ago to clarify details of their requisition for supplies. He received no responses so he placed the orders in accordance with his interpretation of the requisition. Mr. Franz asked Dr. Noplani to review the order and correspondence and call back to clarify the matter. On hanging up the phone, Dr. Noplani requested Mr. Orderlo to create space in the store room for the cold boxes, to contact the works department to enquire about temporary storage of the new freezer, and, to ask the bacteriology department for use of their cold room for storing the maintenance medium.

By lunchtime Dr. Noplani discovered that Mr. Orderlo had indeed sent a list to Mr. Franz at AWFULS asking him to order 500 litres of maintenance medium, 1 freezer, and 2 cold boxes.

No record could be found of the follow-up emails from Mr. Franz. On the other hand, the institute had been without email service for a 2 months period. With heavy heart Dr. Noplani and Mr. Orderlo acknowledged in a conference call with Mr. Franz that:

- The laboratory used autoclaveable powdered medium, not pre-prepared liquid medium.
- Only an upright freezer would fit in the designated laboratory space.
- The unit size for the cold boxes ordered by Mr. Franz was 500 pieces and not 1 piece.

All parties agreed to pay closer attention to the specifications and documentation of supplies being procured in the future.

Meanwhile, if any of the readers happen to visit Dr. Noplani, please avoid asking about the freezer and cold boxes in the corridor outside her office.

Editorial Tips:

- **When ordering supplies,**
 - Calculate the quantity needed according to work load and stock balance. Add a reserve quantity required for at least 3 months to ensure continuity and uninterrupted testing.
 - Order no more than is required for a 3 month reserve. Excessive stock reduces storage space and increases the risk of expiration, deterioration and wastage.
 - Provide complete (detailed) ordering information specifying quantity.
- **When supplies arrive in the laboratory,**
 - Check to ensure that the items delivered are what were ordered and that the items are in good condition.
 - Label each item with the date received.
 - Acknowledge receipt and report any defects promptly.
 - Keep shipment documents, package inserts and equipment manuals on file.
- **When storing supplies and reagents,**
 - Follow the manufacturer's or shipper's storage instructions.
 - Check expiration dates and ensure dates are visible in storage.
 - Store and issue supplies according to First-to-Expire, First-In First-Out policy. Ensure oldest items are stored in front.
 - Store in an orderly fashion. Keep similar items together.
 - Store all stock items in a well-ventilated, clean and tidy room.
 - Protect supplies from direct sunlight, heat, fire, pests, dust accumulation, or theft.
- **Maintain an accurate and efficient stock management system**
 - Assign a supplies officer or logistician.
 - Maintain a Stock Book that lists all items in the storeroom at any given time. Entries should include item name, brand, product code, size, unit of issue, quantity issued, and balance-on-stock. Flag critical stock levels for re-order. A simple computerized inventory spreadsheet (using software such as Excel) is adequate.
 - Maintain a Stock Card for each item that records date of receipt, brand, product code, lot number, expiry date, storage location, quantity received, issued, and on hand.
 - Keep records up to date and track supplies on order.
 - Make a complete physical inventory at least annually to confirm stock records.

Poliovirus Surveillance Report

National Laboratory

Region	Time Period	Number of AFP Cases with Specimens	Poliovirus Typing Results								
			Number of AFP cases positive for:						No. of Pending Culture Results	% Positive for NPEV	% Results Within 28 Days
			P1 only	P2 only	P3 only	Polio Mix	Polio + NPEV	NPEV only			
AFR	Jan to Dec 2006	13,046	1,193	91	382	114	19	1,839	7	14%	98%
AMR	Jan to Dec 2006	1,991	11	10	16	6	0	160	0	8%	85%
EMR	Jan to Dec 2006	8,733	179	53	127	90	36	1,710	6	19%	99%
EUR	Jan to Dec 2006	1,336	11	9	20	16	1	64	1	5%	98%
SEAR	Jan to Dec 2006	35,453	1,411	156	287	274	299	8,246	13	20%	99%
WPR	Jan to Dec 2006	6,469	24	76	57	38	25	660	616	10%	95%

Regional Reference Laboratory

Region	Time Period	Number of AFP Cases with Isolates Submitted for ITD	Poliovirus Intratypic Differentiation Results										% AFP Cases with ITD Results Within 14 Days	
			Type 1			Type 2			Type 3			Pending		
			Wild	Sabin	VDPV##	Wild	Sabin	VDPV##	Wild	Sabin	VDPV##	ITD Discor-dant Results		ITD Tests Pending#
AFR	Jan to Dec 2006	1,979	926	276	0	0	165	16	279	183	0	0	4	66%
AMR	Jan to Dec 2006	43	0	13	0	0	15	0	0	21	0	0	0	98%
EMR	Jan to Dec 2006	485	86	179	0	0	108	2	22	196	1	3	2	97%
EUR	Jan to Dec 2006	57	0	12	0	0	18	0	0	26	0	0	1	100%
SEAR	Jan to Dec 2006	2,427	639	1209	1	0	353	0	28	544	0	0	17	89%
WPR	Jan to Dec 2006	310	1	73	1	0	167	0	0	127	1	20	0	55%

Number of cases with any isolates pending completion of ITD tests

Only for isolates designated as VDPV from sequencing of VP1 gene

AFR: Wild virus cases were reported from 9 countries up to December 2006: Angola (2), Cameroon (2), Chad (1), Democratic Republic of Congo (13), Ethiopia (17), Kenya (2), Namibia (18), Niger (11) and Nigeria (1127). In 2005 wild viruses were also detected in 8 countries: Angola (10), Cameroon (1), Chad (2), Eritrea (1), Ethiopia (22), Mali (3), Niger (10) and Nigeria (792). Between January 2005 and December 2006, serotypes 1 and 3 viruses were both found in Cameroon, Niger and Nigeria. Only type 3 virus was found in Chad and all other countries had only type 1 cases. Based on VP1 sequences, endemic viruses were transmitted in Nigeria, while other countries had transmission of imported viruses. Viruses in Angola, DRC and Namibia were genetically linked to India viruses, while viruses in other countries were linked directly or indirectly (via intermediate countries) to Nigeria viruses. Vaccine derived polioviruses (VDPV) were isolated from several AFP cases in Nigeria in 2006 (type 2).

AMR: The region continues to be free of wild polioviruses. Type 1 VDPVs were isolated in 2005 in Minnesota, USA, from a single immunodeficient child and 3 community contacts.

EMR: Wild viruses were detected in 4 countries up to September 2006: Afghanistan (31), Pakistan (40), Somalia (36) and Yemen (1). Wild viruses were detected in these same countries, as well as in Sudan, in 2005, and the total reported cases were Afghanistan (9), Pakistan (28), Somalia (185), Sudan (27) and Yemen (478). Indigenous types 1 and 3 viruses were found in Afghanistan and Pakistan, whereas the remaining countries had transmission of imported type 1 viruses linked to Nigeria. VDPVs were isolated during 2006 from immunodeficient persons in Iran (one type 3 and one type 2), Kuwait (one type 3), and Syria (one type 2).

EUR: The region continues to be free of wild polioviruses. Type 2 VDPVs were isolated from immunodeficient children: one of Tunisian origin (detected in France in 2006), and, another of Moroccan origin (detected in Spain in 2005). Type 2 VDPVs were also isolated from sewage samples collected in Israel and Czech Republic in 2006. No paralytic cases were associated with VDPVs in these locations despite follow-up investigations.

SEAR: Wild polioviruses were isolated from AFP cases in 4 countries up to mid-2006. Bangladesh (18), India (674), Indonesia (2), and Nepal (5). With the exception of Bangladesh, these countries also had wild virus cases in 2005. Cases in India were due to indigenous type 1 and 3 viruses. Cases in Bangladesh and Nepal were due to type 1 viruses imported from India, while cases in Indonesia were due to spread of imported type 1 virus genetically linked to viruses from Nigeria. Type 1 VDPVs were isolated from 1 AFP case and 7 contacts in Myanmar in 2006 and from 46 AFP cases in Indonesia in 2005.

WPR: Wild type 1 poliovirus was isolated in Singapore in 2006 from an AFP case which had disease onset in Nigeria. VDPVs were isolated from AFP cases in China (1 type 1 and 1 type 3) and Cambodia (1 type 3) in 2006.

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